The Agricultural Department, Madras

Bulletin No. 27

ANNOTATED LIST

OF THE

INSECTS AFFECTING THE IMPORTANT CULTIVATED PLANTS IN SOUTH INDIA

BY

T. V. RAMAKRISHNA AYYAR, B.A., PH.D., F.Z.S.

(Madras Agricultural Department)

(This replaces Bulletin No. 86 of 1923)

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PREFACE TO THE SECOND EDITION.

There is no doubt that since the publication of the list in 1923 our knowledge of South Indian insects has considerably increased, and during these eight years several new forms have attracted our attention and numerous additional facts have been noted of many previously known forms. In this present edition an attempt is made to present the original list with some improvements in the way of some additions and alterations in the light of additional knowledge we have gained of South Indian insects. In doing so not only has the original list been revised by necessary additions and alterations, but the author has also ventured to add some additional information which might in his opinion enhance the usefulness of this bulletin for easy reference purposes. In addition to the revised list of crop-insects which forms the major part of the publication two important and useful things are added:—(1) A separate list of the insects arranged in their natural orders, and (2) Three illustrated crop-pest calendars referring to the Madras Presidency. As stated in the preface to the first edition, even this second edition cannot be said to be a complete list of the crop insects of South India or the last word on the subject; for, it is very likely that at any time in the future new pests might be discovered and new observations made on already known insects; no pains have, however, been spared to include in the list all forms worthy of being noted by gathering information from many scattered sources and make the same as up to date as possible. For detailed information on some of the important pests readers are referred to the different leaflets and bulletins issued by the Agricultural Department from time to time. For proper identification of some of the insects in the list the writer is indebted chiefly to the Imperial Institute of Entomology, London, and the Imperial Entomologist, Pusa. The writer is also indebted for some valuable information on some Mysore insects to the "Notes on some important Mysore crop-pests" contributed to the "Journal of the Agricultural and Experimental Union" by my brother T. V. Subrahmanya Ayyar, now Acting Entomologist in the Mysore State.

It is hoped that with all its inevitable defects this new edition may help those who are interested in the subject and perhaps contribute to encourage the study of Agricultural Entomology in South India.

September 1931. T. V. RAMAKRISHNA AYYAR.

PREFACE TO THE FIRST EDITION.

This pamphlet is prepared with the idea of supplying the educated agriculturists, district revenue and agricultural officers, agricultural students and all interested in South Indian Agriculture with a handy and up-to-date reference list of the more important insects injurious to different crops cultivated in South India, especially in the plains. It is believed that the list, with all its inevitable defects, will not only help such persons to get an idea of the chief pests of the particular crops they may grow, but will also aid them in identifying different insects which may now and then appear in their fields. This is not the first list of South Indian insect-pests, which has been issued; Mr. Fletcher issued a list in 1913. The present list however, besides being up to date, differs from the old one in two or three important points. Firstly, the arrangement is quite different, the insects being listed according to the crops they attack and not under their scientific orders and families; secondly, many of the forms in the former list which have been found to be of minor or no economic importance are omitted; and, thirdly, new forms noted since 1913 have been included. In addition, brief notes regarding the nature of injury to the crops, vernacular names where available, control measures wherever possible and references to illustrations are added in the list. It is hoped that the present list will be acceptable to our district officers and agriculturists as an up-to-date pocket reference list of insect-pests.

It may be added that this list is issued as a companion to the author's previous bulletin * on the "Entomologist's Crop-pest Calendar for the Madras Presidency." It is hoped that both these together may form an easy reference record of the important insect-pests of South India showing their distribution, their seasonal appearance, the nature of the damage they do, and other important facts that could possibly be brought within the compass of a small popular pamphlet. It is needless to add that only the more important pests of the different crops are listed, and greater attention is

* Bulletin No. 80, 1921.

paid to crops of the plains than to those of the hills, as our knowledge of the latter is very limited. The information attempted to be given under each insect consists of its popular name, its distribution as a pest, the nature of damage it does, its scientific name, possible control measures against it; and references to vernacular names, if any, and to illustrations of such of those insects in the list as are recorded in Fletcher's "Some South Indian Insects," the only book on South Indian insects published till now. The control measures suggested for each insect are only brief hints and suggestions that can be added within the small space allotted; so it is advisable to get further detailed information from books and specialists, especially in cases where insecticides are attempted to be used. Unimportant plants and plants on which no important insects have been noted till now have not been included; nor do insects of minor importance find a place here.

The list can by no means be said to be complete as new and important pests are frequently noted; but it is believed to be up to date as far as our knowledge of South Indian insects has advanced and might serve the purpose for which the author has prepared it.

October 1922. T. V. RAMAKRISHNA AYYAR.

ANNOTATED LIST OF THE INSECTS AFFECTING THE IMPORTANT CULTIVATED PLANTS IN SOUTH INDIA.

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CHIEF REFERENCES CITED WITH THE ABBREVIATIONS USED IN THE LIST.

S.S.I. = Some South Indian Insects by T. B. Fletcher.

P.P.B. = Paddy Pests Bulletin by T. V. Ramakrishna Ayyar.

Cocc. Bull. = Bulletin on South Indian Coccidae by T. V. Ramakrishna Ayyar.

Tob. Bull. = Tobacco Insects Bulletin by T. V. Ramakrishna Ayyar.

Thy. Mem. = Memoir on Indian Thysanoptera by T. V. Ramakrishna Ayyar.

I.—INSECTS AFFECTING IMPORTANT CULTIVATED PLANTS IN SOUTH INDIA.

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
			CEREALS.		
			PADDY (*Oryza sativa*).*		
† Paddy swarming caterpillar.	West Coast tracts, Northern Circars, Tinnevelly, Chinglepat, Mysore.	The caterpillar defoliates seedlings in the nurseries and young plants in the fields.	*Spodoptera mauritia*, B. (Noctuid—moth).	Flood the infested field and nurseries where water is available. Sweep with handnets in nurseries when the caterpillar is very young.	One of the worst pests of paddy in South India. (Colour Pl. XX, S.S.I.)
Paddy stem-borer.	Northern Circars, Ceded Districts, Ramnad, South Malabar, Mysore.	The caterpillar bores into the paddy stem and kills the shoot or causes white ears.	*Schoenobius incertellus*, W. (Pyralid—moth).	Collect eggmasses and destroy dead seedlings in nurseries before transplantation. Difficult to control in later stages.	Sometimes reported as a serious pest from Northern Circars. (Col. Pl. XXIX, S.S.I.)
† Rice hispa ...	West Coast, Salem, Chingleput, Northern Circars, North Arcot, Chittoor and South Arcot.	The grub mines into the leaf tissue and the beetle scrapes the green foliage.	*Hispa armigera*, Ol. (Chrysomelid—beetle).	Use the handnet and clip tips of seedlings, especially in the nurseries, where the pest starts.	This small bluish spiny black beetle is often found bad in South Kanara. (Col. Pl. IX, S.S.I.)
Rice leptispa ...	Malabar; very rarely in other rice tracts.	Grub and adult feed on foliage.	*Leptispa pygmoea*, B. (Chrysomelid—beetle).	Same as hispa	This is a smooth bluish black beetle. (Fig. 165, S.S.I.)
† Rice bug ...	West Coast, Coimbatore, Tinnevelly and rarely in the Northern Circars.	The adult and young ones suck the juice from the tender ears and shoots.	*Leptocorisa acuta*, Th. (Coreid—bug).	Use handnet or big sweeping bag. Remove from the bunds other grasses on which the bug breeds.	Bad in some years in the West Coast where it is called "*Chazhi*" in Malayalam; and *Bambuchu* in Kanarese; emits a bad smell. Found also on ragi, cumbu, and other grasses now and then. (P.P.B., Pl. II-5-8).

* For fuller information on Paddy pests the writer's bulletin on Paddy insects (Madras Agrl. Dept. Bulletin No. 25, 1931) may be consulted. See also departmental leaflets Nos. 40, 41 and 42 on these three pests.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
			CEREALS—*cont.*		
			PADDY (*Oryza sativa*)—cont.		
Rice grass-hoppers.	West Coast, Mysore, Northern Circars, Tinnevelly, Chingleput and Coimbatore.	Feed on foliage and cut earheads.	*Hieroglyphus banian*, F. and *H. orizivorus*, U. (in Ganjām) (Acridiid grasshoppers).	Use handnets and bags on the field bunds soon after the early rains when eggs hatch out into hoppers; scrape bunds to destroy eggs in summer wherever possible.	Known as "*Pulpundu*" in South Malabar. (P.P.B., Pl. III-1-3.)
Small grass-hopper.	Common all over the province and rarely as a pest.	Same habits as rice-grasshopper.	*Oxya velox*, F. (Acridiid—grasshopper).	Use handnets when found in numbers.	Fig. 426, S.S.I.
Rice case worm.	West Coast, Coimbatore, Mysore, Chingleput and Vizagapatam.	The caterpillars cut the leaves into pieces and make cases in which they live and feed on the paddy leaves.	*Nymphula depunctalis*, Gr. (Pyralid—moth).	Flood the field, shake the plants with a long pole to make the cases drop down. Drain the water or spray a thin film of kerosine oil on the water to kill the worms in the cases.	The injury done to paddy is known as *Kokku novu* in Tamil. (Col. Pl. XXXII, S.S.I.)
Rice leaf-folder.	West Coast tracts and Ganjām.	Caterpillar rolls up leaf-tips and feeds on the green matter.	*Cnaphalocrocis medinalis*, Gr. (Pyralid—moth).	Clipping the leaf-rolls at the early stages.	Sometimes sporadic causing appreciable harm. (P.P.B., Pl. V-5.)
Paddy gall-fly.	N. Circars, Tanjore, Ramnad and West Coast.	The maggot bores into the stem, attacks bud of shoots and causes galls known as silver shoots. No ears are formed.	*Pachydiplosis oryzæ*, W. (Cecidomyiid—fly).	No effective remedy known yet; keep the field bunds clear of wild grasses in which this insect often breeds.	The disease is called "*Anaikombu*" in Tamil, "*Kodu*" in Telugu. (P.P.B., Pl. IV-1.)

Paddy mealy-bug.	South Arcot, Trichinopoly, Salem, Tanjore, Coimbatore, and rarely in Northern Circars.	Colonies of this minute insect infest the inside of the paddy leaf sheaths and suck up the plant sap.	*Ripersia oryzæ*, Gr. (Coccid—mealy bug).	No effective remedy known. As a preventive, the early attacked plants may be removed and burnt to prevent spread. Infested seedlings may be eliminated while transplanting.	The disease is known as "*soorai*" in Tamil and is sometimes bad in Trichinopoly, Tanjore and South Arcot. Affected fields show patches of plants with disease called "*Dumputegulu*" in Northern Circars. (P.P.B., Pl. IV-2.)
Rice thrips ...	Coimbatore, Tanjore, Malabar, Chingleput and Mysore.	Very small insects found in numbers on seedlings sucking up plant juice.	*Thrips oryzæ*, W. (Thripidæ—Thrips).	Easily checked by flooding if water is available. A rain will check the pest.	The insect appears when the seasonal rains are delayed. (P.P.B., Pl. IV-3.)
Paddy striped bug.	Cauvery valley areas in the Trichinopoly District.	Settles in numbers on young plants and sucks up juice.	*Tetroda histeroides*, F. (Pentatomid—bug), another dark pentatomid *Scotinophora lurida* B. is occasionally found with *Tetroda*.	Handpicking and bagging in early stages and spraying of a deterrent if necessary.	A brown bug with two whitish stripes. (P.P.B., Pl. VI-4.)
Climbing cut-worm.	Coromandel area in January-February.	Defoliation and cutting of earheads.	*Cirphis albis tigma*, M. (Noctuid—moth).	No effective measures known. Handpicking in early stages may check multiplication.	Others noted now and then are *C. loreyi*, D. once noted in Tanjore. *Cirphis micaceae*, H in Cochin (1931). Another Noctuid found is *Borolea venalba*, M. (Tanjore, Chingleput). (P.P.B., Pl. V-2.)
Paddy root caterpillar.	North Malabar (in sandy coastal tracts).	Caterpillars cut the leaves and stems of young paddy and drag them below the soil; they live in tubular galleries below the plants.	*Ancylolomia chrysographella*, K. (Pyralid moth).	A smart rain or flooding will bring up the caterpillars and expose them to insect-feeding birds.	Occasionally serious to young broadcasted paddy in April-May. (P.P.B., Pl. V-4.)
Rice chafer ...	Kanara and Mysore.	Grubs attack roots of young plants.	*Phyllognathus dionysius*, F. (Dynastid—beetle).	Light traps may be kept early in the season to catch the adults. Irrigation water may be mixed with some crude oil emulsion.	Very rarely noted as injurious. (P.P.B., Pl. VII-1.)

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		CEREALS—*cont.*			
		PADDY (*Oryza sativa*)—cont.			
Root weevil ...	Kistna and Guntūr.	Grubs attack roots of young plants under water.	*Echinocnemus oryzæ*, M. (Curculionid—beetle).	Irrigation water may be mixed with some crude oil emulsion or the water drained off.	A pest of very minor importance. (P.P.B., Pl. VII-4.)
Paddy semi-looper.	Coimbatore, Malabar, and other paddy areas.	Feeding on leaves ...	*Pelamia frugalis*, F. (Noctuid—moth).	Never noted as a pest ...	(P.P.B., Pl. V-3.)
Yellow hairy caterpillar.	Northern Circars and in all grass and paddy areas.	.....	*Psalis securis*, H. (Lymantrid—moth).	Do. ...	Often found breeding on grasses. (P.P.B., Pl. V-1.)
Rice skipper...	In all paddy tracts ...	Feeding on leaves ...	*Parnara mathias*, F. (Hesperiid--butterfly).	Handpicking or netting of the caterpillars and butterflies.	A smooth green caterpillar with distinct head. Pl. XXVII, S.S.I.
Horned caterpillar.	Do. ...	Do. ...	*Melanitis ismene*, C. (Nymphalid—butterfly).	Do.	A smooth green caterpillar with a pair of red horn-like processes on head. (P.P.B., Pl. III-7–9.)
Paddy earhead bug.	Malabar, Kanara, Tinnevelly, and Anantapur.	Sucking tender ears ...	*Menida histrio*, F. (Pentatomid—bug).	Netting the bugs	A small reddish brown active insect. (P.P.B., Pl. VI-1.)
Green spotted jassid.	In all paddy areas ...	Sucking tender parts; often appearing in swarms and occasionally doing severe damage.	*Nephotettix bipunctatus*, F. (Jassid—bug).	Netting and light traps. Collecting with sticky winnows.	Noted as serious in parts o Bengal and Central Province, minute green insect. Recently reported from Madura and Ramnad. (P.P.B., Pl. VI-3.)
White jassid.	Do. ...	Do.	*Tettigoniella spectra*, D. (Jassid—bug).	Collecting with handnets or bags and use of sticky winnows.	A whitish insect slightly bigger than *Nephotettix*. Fig. 385, S.S.I.

Circars jassid.	Northern circars ...	Occasionally appearing in swarms; suck young plants and make them fade in patches in fields.	*Deltocephalus dorsalis*, M. (Jassid—bug).	Do.	Small-sized sporadic leaf-hopper pests in different tracts appearing in some years and causing some damage. For figures see P.P.B., Pl. VI.
Kistna leaf-hopper.	Nellore, Kistna, Malabar and Cochin.	Do.	*Nilaparvata sordescens*, M. (Delphacidæ—fulgorid bug).	Do.	
Leaf-hopper ...	Nellore	.....	*Nysia atrovenosa*, L. (Cixiidæ—fulgorid bug).	Do.	
North Malabar leaf-hopper.	North Malabar ...	Occasionally appearing in swarms; suck young plants and make them fade in patches in fields.	*Erythnoneura subrufa*, M. (Fulgorid-bug).	Do.	
Paddy leaf-weevil.	Coimbatore ...	Feeding on paddy leaves.	*Athesapeuta oryzae*, M. (Curculionid—weevil).	Hardly a pest	Another grey weevil, *Myllocerus dentifer*, F. is occasionally seen in some places on paddy but rarely doing serious harm. (P.P.B., Pl. VII-2.)
Striped leaf-beetle.	Malabar	Do.	*Oides affinis*, F.* (Chrysomelid—beetle).	Hardly a pest, though found in numbers sometimes.	Reddish brown beetle with a black mark on each forewing. Fig. (P.P. B., Pl. VII-5.)
Yellow blister beetle. Green blister beetle.	In most tracts ...	Feed on the flower heads, chiefly pollen.	*Gnathospastoides rouxi*, C. *Lytta tenuicollis*, Pall *Epicauta sp.* (Canthari d—beetles).	Easily checked by netting or driven by smoke; beetle remains on plant only for a short time generally.	Figs. 147, 148, 154, S.S.I.
Blue black blister beetle.	South Kanara ...	Do.			
Paddy Eupterotid.	Agency tracts, Vizagapatam.	Caterpillars feeding on foliage.	*Nisaga simplex*, W. (Eupterotid—moth).	Rarely a pest	Stout brown moth.
Paddy surface grass-hoppers.	Coimbatore, Anantapur, etc.	Feeding on young plants and doing some appreciable damage especially in small areas and nurseries.	*Acrotylus humbertiana*, S. *Heteropternis respondens*, W., *Aelopus affinis*, B., *Locusta danica*, L., *Pyrgomorpha conica*, O. (Acridiidæ—grasshoppers).	Can be easily checked by netting, by poison baits or by poison dusting.	Chiefly found in nurseries. All are small grass-hoppers, greenish, greenish brown or yellowish brown in colour.

* The blue leaf beetle *Haltica cyanea*, J. is often found in numbers on paddy; it is not a pest of paddy but breeds on the plant *Ammania* in paddy fields.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
			CEREALS—*cont.*		
			PADDY (*Oryza sativa*)—cont.		
Rice stem fly...	Coimbatore	Larva boring in stem.	*Atherigona sp.* (Anthomyiid—fly).	Only preventive methods feasible in this case.	The insect is a minute fly noted only now and then in small numbers.
Rice flea beetle.	Gōdāvari	Causes dead-hearts in nurseries.	*Chaetocnema sp.* (Halticid—beetle).	Do.	Very minute active beetles; rarely serious.
			CHOLAM (*Andropogon sorghum*).		
Cholam stem-borer.	Northern Circars, Ceded districts, Coimbatore and Tinnevelly.	Caterpillars bore through stem killing young plants and damaging older stems.	*Chilo zonellus*, S. and *C. Sp.* (Pyralid—moths).	Collect and destroy dead-hearts and destroy stubble after harvest. Difficult to check on old plants.	More injurious to young plants; also found on maize, ragi, sugarcane, etc. Fig. 300, S.S.I.
Cholam earhead bug.	Ceded districts, Coimbatore, Tinnevelly and Northern Circars.	The active green insects suck up the sap from tender earheads.	*Calocoris angustatus*, L. (Capsid—bug). Another capsid, *Megacoelum syramineum*, W. is also found with this bug occasionally.	No effective remedy known. In young and short plants netting and sticky winnows may be tried to reduce damage.	Sometimes serious in Coimbatore and the Ceded Districts. Fig. 376, S.S.I. called "*Aggi purugu*" in Ceded District.
Red hairy caterpillar.	In all dry areas, especially in red soil tracts of South Arcot, Salem, Ceded Districts, Trichinopoly and Mysore.	Feeding on every part of the plant and skeletonising it.	*Amsacta albistriga*, W. (Arctiad—moth).	Light traps and handpicking moths soon after the early rains when they emerge; plough badly infested fields in summer to expose underground pupae.	Not so bad as on cumbu or groundnut. See Mysore bulletin on the "*Kambli hula*." Pl. XVII, S.S.I. A pest of many other plants.

Cholam fly ...	Coimbatore, Mysore and adjacent tracts.	Larva attacks young seedlings causing dead-hearts.	*Atherigona indica*, M. (Anthomyiidae—fly).	Dead seedlings to be pulled out and destroyed while the field is thinned; seed rate may be slightly increased in localities subject to infestation.	Generally attacks only seedlings. (Fig. 215, S.S.I.)
Cholam shoot bug.	Coimbatore, Ceded Districts and Northern Circars.	Colonies of this small insect infest tender leaves and suck the juice.	*Pundaluoya simplicia*, D. (Fulgorid—bug).	No effective remedy known; pull out first attacked plants to check spread; in valuable plots spraying may be done with a contact insecticide.	Badly infested plants appear as though scorched by fire. Ants are found visiting these insects. They are often found in company with plant-lice. (Fig. 382, S.S.I.)
Shoot caterpillar.	Coimbatore	Feeding on foliage from inside leaf shoots.	*Cirphis unipuncta*, M. and rarely *C. loreyi*, D. (Noctuid—moths).	Handpicking or dusting shoots with arsenates if necessary.	Not a serious pest generally; a stout smooth caterpillar, one of the army or cutworms. Pl. XVIII, S.S.I.
Leaf-roller ...	In all dry tracts ...	Rolling leaf and feeding from inside roll.	*Marasmia trapezalis*, G. (Pyralid—moth).	Of minor importance ...	A yellowish brown moth with wavy marks on wings. Pl. XXXIII, S.S.I.
Leaf weevil ...	Coimbatore, Northern Circars and Ceded Districts.	Feeding on leaves ...	*Myllocerus discolor*, B. (Curculionid—beetle).	Do. ...	A greyish brown sp. fairly common everywhere; the grub is often found feeding on roots of cholam, ragi, etc.
Cholam aphid.	Coimbatore and Northern Circars.	Found in colonies inside tender shoots sucking up juice.	*Aphis maidis*, F. (Aphidae—bug).	Dust tobacco powder, if necessary.	Rarely a pest. Commonly kept in check by predatory insects.
Earhead caterpillar.	Tanjore	Feeding on the ripening grains.	*Eublemma silicula*, S. (Noctuid—moth).	Very rarely a pest	The adult insect is a small pale brown moth.
Earhead webber.	Ceded Districts and Coimbatore.	Caterpillars found webbing the grains in the earhead and feeding on the grains.	*Stenachroia elongella*, H. (Pyralid—moth).	Rarely a pest and only of local importance.	Fig. 296, S.S.I.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		CEREALS—*cont.*			
		CHOLAM (*Andropogan sorghum*)—cont.			
Plant bugs ...	Northern Circars, Tinnevelly, and many other parts.	Attacking tender parts, especially the ripening earheads and sucking the plant sap.	*Nezara viridula*, L., *Dolycoris indicus*, S., *Agonoscelis nubila*, F., *Piezodorus rubrofasciatus*, F. (Pentatomid—bugs).	Handpicking and netting ...	Figs. 352, 347 and 351, S.S.I. Found mostly confined to the earheads
Earhead chafers.	Ceded Districts and Coimbatore.	Feeding on the ears and pollen.	*Anatona stillata*, N., *Oxycetonia versicolor*, F., *Chiloloba acuta*, W. *Protaetia aurichalceae*, F. (Cetonidae—chafer beetles).	These beetles are conspicuous and can be easily checked by handpicking and netting, but they are pests very rarely.	Figs. 122, 123 and 124, S.S.I.
Earhead blister beetles.	Do.	Do.	*Gnathospastoides rouxi*, C., *Lytta tenuicollis*, P. (Cantharid—beetles).	As on Paddy	See under Paddy.
Surface grasshopper.	Do.	Attacking young plants and often cutting them down.	*Chrotogonus saussurei*, B. (Acridiid—grasshopper).	Netting and poison traps ...	Small active creatures often resembling the soil in colour.
Cholam gall-fly.	Coimbatore	Breeding inside the tender grains of cholam and making seeds empty.	*Contarinia andropogonis*, Felt. (Cecidomyid—fly).	No remedy known	Sometimes sporadic.
Cholam mite ...	In most cholam tracts.	The leaves are turned sickly red by colonies of the mite feeding on the leaf tissue.	*Paratetranychus indicus*, H. (Acari—mite).	Dusting of fine powdered sulphur.	An occasionally serious pest. Not an insect.

RAGI (*Eleusine coracana*).

Pink borer ...	Coimbatore, Ceded Districts and Northern Circars.	Caterpillar bores into stem and kills central shoot.	*Sesamia inferens*, W. (Noctuid—moth).	Same measures as suggested for cholam stem-borer above.	Also found on wheat maize, sugarcane and cholam. The caterpillar has a uniform pink colour. (Pl. XXI, S.S.I.)
White borer ...	Coimbatore and Ceded Districts.	Caterpillar bores into lower portions of the stem.	*Saluria inficita*, W. (Pyralid—moth).	Same as above; the moth comes to light and so light traps may be tried early in the nurseries to trap moths about to lay eggs.	The borer is cream white in colour. Noted on paddy in Mysore. (Fig. 304, S.S.I.)
Cholam stem-borer.	In all tracts ...	Bores into stem as in cholam.	*Chilo zonellus*, S. (Pyralid—moth).	As on cholam	See under cholam stem borer.
Black hairy caterpillar.	Coimbatore ...	Eats leaves and earheads.	*Estigmene lactinea*, Cr. (Arctiad—moth).	Collect the caterpillars in the early stages by jerking the infested leaf over a pan of water containing a little kerosene.	Known as the wooly bear caterpillar; found on cumbu also. (Fig. 230, S.S.I.)
Root lice ...	Coimbatore tract ...	The minute insects attack roots and suck up the juice.	*Tetraneura hirsuta*, B. (Aphidid—bug).	Irrigate with water mixed with a little of kerosene emulsion or Crude oil emulsion.	Small white insects found in numbers attached to the underground roots and rootlets. (Fig. 390, S.S.I.)
Earhead caterpillar.	Coimbatore and Mysore.	Caterpillar attacks earheads in stacks soon after harvest.	*Simplicia robustalis*, G. (Noctuid—moth).	Thrash the harvested crop soon after harvest.	Found as a pest of thatching material in Coimbatore.
Leaf Noctuid.	Coimbatore, Vizagapatam and many other places.	Sometimes bad in nurseries feeding on the young plants.	*Laphygma exigua*, Hb. (Noctuid—moth).	Netting or dusting arsenates.	Fig. 240, S.S.I.
Thrips ...	Coimbatore ...	Sometimes bad in nurseries; sucking up the plant juice from seedlings	*Heliothrips indicus*, B. (Thripidae—thrips).	Flood the nurseries or spray tobacco decoction.	Very minute insects. See Fig. 1, Thy. Mem.
Grasshoppers.	Coimbatore, Tinnevelly and Ramnad.	Feeding on foliage of the young plants.	Several different kinds noted such as spp. of *Oedaleus*, *Aeolopus*, *Chrotogonus*, *Acrotylus*, etc.	Use handnets or sweeping bags.	These do more harm when the crop is young when they can be easily checked.
Flea beetles.	Coimbatore ...	Biting holes in the tender foliage.	*Chaetocnema sp.*, a leaf-beetle. *Lema downsei*, B. is also found. (Hispid beetles).	Netting or dusting of arsenates.	Very minute and active beetles; occasionally doing some damage.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		CEREALS—*cont.*			
		CUMBU (*Pennisetum typhoideum*).			
Red hairy caterpillar.	Coimbatore, Tinnevelly, South Arcot, Salem and Ceded Districts.	Feeds on the leaf, earheads and stem.	*Amsacta albistriga*, W. (Arctiad—moth).	Same as the one noted above on cholam.	Sometimes a bad pest of cumbu and groundnut. (Pl. XVII, S.S.I.)
Green plant-bugs.	Tinnevelly, Ramnad and Coimbatore.	Suck the juice from the tender parts.	*Nezara viridula*, L. *Eusarcocoris guttiger*, Th. (Pentatomid—bugs).	Easily checked by handpicking or by using handnets. The eggs and nymphs which are easily found cut can also be destroyed promptly.	Nezara known as "*Pachalai*" and "*Navai puchi*" in Tamil. Green and flattish with the buggy smell. The other bug is small brownish insect.
Black hairy caterpillar.	Coimbatore ...	Feeds on the leaf, earheads and stem.	*Estigmene lactinea*, Cr. (Arctiad—moth).	Same as noted above on ragi.	Not commonly found.
Deccan grasshopper.	Ceded Districts and Northern Mysore.	Feeding on all parts of the plant.	*Colemania sphenarioides*, B. (Acridiid—grasshopper).	Netting, bagging, etc. ...	A wingless grasshopper also found on cholam, tenai, etc. So far confined to Ceded Districts.
Tinnevelly wingless grasshopper.	Coimbatore and Kovilpatti.	Feeding on all parts of the plants.	*Othacris simulans*, Bol. (Acridiid—grasshopper).	Do. ...	A small wingless grasshopper.
Earhead beetles.	Coimbatore, Ceded Districts, Tinnevelly, South Arcot and Northern Circars.	Eat up the flower heads and ripening ears.	*Gnathospastoides rouxi*, C. *Lytta tenuicollis*, P. (Canthrid—beetles).	The beetles are sluggish and so can be handpicked or collected in handnets easily. They can also be smoked out of the fields.	These generally appear when the plants are in flower and disappear very soon. (Figs. 153, 148, 147, S.S.I.)
Seed bug ...	Kistna District ...	Sucks the grain soon after harvest.	*Aphanus sordidus*, F. (Lygaeid—bug).	Collect bugs with nets or cover harvested seeds.	See under groundnut.

TENAI (*Setaria italica*).

Deccan grass-hopper.	Bellary District and North Mysore.	Completely eats up the young and grown up plants.	*Colemania sphenarioides*, B. (Acridiid—grasshopper).	Netting, bagging, and poison traps.	Very serious during certain years in Bellary District; does more harm to this crop than others in this tract.
Tenai erotylid.	Coimbatore	Larva bores into stem ...	*Anadastus parvulus*, W. (Erotylid—beetle).	Destruction of first attacked shoots and collection and destruction of the beetles when found.	A blue and red beetle; not an important pest.
Leaf-weevils.	South Arcot, Coimbatore and Ceded Districts.	Eating the leaves ...	*Myllocerus dentifer*, F., and *M. transmarinus*, H. (Curculionid—weevils).	Handpicking and netting. The beetles could be jarred from the plants over a bucket of water and kerosene.	Though these are of minor importance they sometimes appear sporadically as pests of millets and defoliate the plants.

MAIZE (*Zea mays*).

Almost all insects found on cholam attack maize also ; of these maize pests the chief are—

Pink borer ...	Coimbatore, Northern Circars and Ceded Districts.	Stem-borer	*Sesamia inferens*, W. (Noctuid—moth).	Same as ragi pink borer; same measures to be adopted.	See under ragi pink borer.
Cholam shoot bug.	Coimbatore, Ceded Districts and Northern Circars.	Sucks the juice from tender parts.	*Pundaluoya simplicia*, D. (Fulgorid—bug).	See under cholam	See under cholam.
Cholam stem-borer.	Do.	Do.	*Chilo zonellus*, S. (Pyralid—moth).	Do.	Do.
Leaf Noctuid.	Coimbatore, Northern Circars, Salem, etc.	Feeds on the foliage and sometimes serious.	*Laphygma exigua*, H. (Noctuid—moth).	Handpick or net caterpillars or dust arsenate on infested plants.	A sporadic local pest in some tracts.
Grasshopper ...	Coimbatore and Northern Circars.	Feeding on green parts ...	*Orthacris elegans*, Bol. (Acridiid—grasshopper).	Do.	Wingless grasshopper.

MILLETS (*Panicum spp.*).

Panivaragu flea beetle.	Coimbatore and Guntūr.	Larva and adults feed on foliage and also cause dead-hearts in nurseries.	*Chaetocnema pusaensis*, M. (Halticid—beetle).	Netting or dusting of arsenates.	Very minute active beetles, occasionally found in numbers.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		CEREALS—*cont.*			
		WHEAT (*Triticum vulgare*).			
Stem-borer ...	Coimbatore and Bellary.	Caterpillar bores into stem and kills shoot.	*Sesamia inferens*, D. (Noctuid—moth).	This is the same as the ragi pink borer and the same measures will apply.	See under ragi pink borer.
Plant lice ..	Do.	The minute insects suck up the juice from tender parts.	*Toxoptera graminum*, R. (Aphid—bug).	If badly infested, the plants may be sprayed with crude oil emulsion if the crop is a valuable one, but generally the pest is checked by predators.	Minute insects found in colonies and visited by ants and predators like lady-bird, beetles, hover flies and chrysopa.
Termites ...	Do.	The ants eat up roots of growing plants.	*Microtermes obesis*, H. (Termitidae—white-ant).	Mix contact insecticide with irrigation water.	
		SUGARCANE (*Saccharum officinarum*).			
Cane stem-borers.	Northern Circars, Coimbatore, South Arcot, Chittoor and South Kanara.	Boring into stem, killing young shoots, and damaging growing canes.	Two or more species are found. Chief species are *Argyria sticticraspis*, H., and *Diatroea venosata*, W. (Pyralid—moths).	The injury is more serious in young plants. Pulling out and destroying dead-hearts will check the spread of the pest. Very little damage done to older plants.	The borers form the most important of cane pests in the province.
Cane white borer.	Coimbatore, South Arcot and Bellary.	The white caterpillar bores into the stem from the topshoot unlike other borers.	*Scirpophaga xanthogastrella*, W. (Pyralidae—moth).	Not so serious as the other borers. In early stages the attacked top shoots may be clipped. Egg-masses easily made out can be collected.	Figs. 302, 303, S.S.I. *S. nivella*, F., is also sometimes noted in Gōdāvari.

Termites ...	In almost all cane tracts.	Bore into the planted setts underground kill the tender shoots and buds.	*Odontotermes obesus*, R. (Termitidae—white-ant). The ant *Dorylus* is also found sometimes.	Fields should be cleared of white-ant nests before planting. Disease-free setts should be planted. Fields showing attack may be irrigated with water containing crude oil emulsion.	The pest is often serious in virgin fields and the setts and seedlings suffer much.
Cane fly ...	South Kanara, Coimbatore, Northern Circars, South Arcot and Gōdāvari.	Sucks up juice from tender portions.	*Pyrilla perpusilla*, W. (Fulgorid—bug).	Leaves containing egg-masses and nymphs can be clipped and the pest easily controlled if attended to in time.	A straw coloured active insect with the head drawn forwards. Serious only in rare cases and in small areas. (Fig. 381, S.S.I.)
Cane mealy-bug.	Coimbatore, South Arcot and Northern Circars.	Numbers of these small insect settle at the lower portions of the cane stem and suck the juice.	*Ripersia sacchari*, Gr. (Coccid—Mealy bug).	Nothing effective can be done except by using healthy seed and treating first attacked canes as a proventive.	Colonies of this insect are found attached to the lower nodes of the cane enclosed by old leaf-sheaths.
Cane scale insect.	Salem	Cover stem inside of leaf sheaths and suck the juice.	*Aclerda japonica*, N. (Coccid—scale insect).	Spraying with contact insecticide.	Rarely a pest.
Cane mealy wings.	Coimbatore, South Arcot and Gōdāvari.	Sucks up juice from leaves and makes the crop sickly and stunted.	*Aleurolobus barodensis*, Msk. *Neomaskellia bergii*, Sign. (Aleurodidae—Mealy wings).	Prune badly infested leaves and spray contact insecticide.	Fig. 394, S.S.I.
Cane hesperid.	Coimbatore, South Arcot and Northern Circars.	Caterpillar feeds on the leaves.	*Telicota augias*, L. (Hesperid—butterfly).	Handpick caterpillars and net butterflies.	Fig. 294, S.S.I.
Cane leaf-hopper.	Do.	Found in numbers on leaves. Leaf-sucking bugs.	*Assamia moesta*, W. (Fulgorid—bug).	Not a pest usually though found in numbers.	Small black fly-like insects. Fig. 380, S.S.I.
Cane hispid.	Coimbatore and Northern Circars.	Grubs and adults feeding on tender foliage.	*Phidodonta modesta*, W. (Hispid—beetle).	Hardly a pest	Insects similar to rice hispa. Plate IX, S.S.I.
Cane thrips ...	Coimbatore and South Arcot.	Sucking juice from tender leaf tips and making them curled and rolled up.	*Bregmatothrips ramakrishnae*, B. (Thripidæ—thrips).	Clipping the curled leaves. A very minor pest.	Minute small insects of a dark brown colour. See page 267, Thy. Mem.
Cane root lice.	Coimbatore	Attack roots	*Tetraneura ulmi, coimbatorensis*, G.	See under ragi root aphis.	Noted only in Coimbatore till now.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		PULSES.			
		RED-GRAM (*Cajanus indicus*).			
Gram caterpillar.	Throughout South India.	Eats leaves and bores into the seed pods eating up the seeds.	*Heliothis obsoleta*, Fb. (Noctuid—moth).	In early stages handpicking may be tried; difficult to check when too late and in large areas.	Also attacks groundnut and Bengal-gram. A stout cylindrical greenish caterpillar. (Fig. 235, S.S.I.)
Plume moth ...	Do.	The same damage as above.	*Exelastes atomosa*, W. (Pterophorid—moth).	Same as above	A small light green caterpillar covered with small spines and hairs. The moth has plumed wings. (Pl. XXXVIII, S.S.I.)
Red hairy caterpillar.	Mysore	Feeding on all green parts.	*Amsacta albistriga*, W. (Arctiid—moth).	See under cholam	Often bad on red-gram in Mysore.
Pod-fly ...	Do.	The small maggot bores into the seed pod and damages the seeds.	*Agromyza obtusa*, M. (Agromyzid—fly).	No effective remedy known.	The adult insect is a very small bluish blackfly like the housefly but much smaller. (Fig. 216, S.S.I.)
Bud weevil ...	Coimbatore and Northern Circars.	The grub and the adult feed on the flowers and buds and destroy them preventing pod formation.	*Ceuthorhynchus asperulus*, F. (Curculionid—weevil).	Shake the shoots and collect the weevils on infested flower buds, or dust with arsenate powder.	Small greenish brown weevil. (Fig. 194., S.S.I.)
Gram pod bug.	Coimbatore, Ceded Districts and Northern Circars.	The adult and young ones suck the juice from young seed pods.	*Clavigralla horrens*, D. Sometimes also *C. gibbosa*, S.	Collect with nets and destroy eggs on pods on leaves.	An active grey brown insect with sharp shoulder spines.
Leaf-weevil ...	Coimbatore, Ceded Districts and South Arcot.	Leaf-eater	*Episomus lacerta*, F., and *Myllocerus spp.* also sometimes found. (Curculionid—weevils).	Collect with handnets ...	Stout ashy grey weevil fairly common on most pulses.

Tussock hairy caterpillar.	Coimbatore and Northern Circars.	Caterpillar feeding on leaves and tender shoots.	*Euproctis fraterna*, M. (Lymantrid—moth).	Handpick leaves containing the larvæ feeding together in numbers and if necessary spray or dust arsenate.	A reddish hairy caterpillar, often found on castor and roses also.
Orange-banded blister beetle.	In all tracts ...	Feeding on flowers and tender shoots.	*Mylabris pustulata*, Th. (Canthari—beetle).	Easily checked by handpicking or netting. The beetles are slow fliers.	The beetle is often found on different kinds of red and yellow flowers such as *Hibiscus*, prickly-pear, gogu, etc. (Fig. 149, S.S.I.)
Crab caterpillar.	Coimbatore, Malabar and Ganjām.	Caterpillar feeds on leaves and shoots.	*Stauropus alternus*, W. (Notodontidae—moth).	Generally not a serious pest. Can be handpicked. Often heavily parasitised.	A curiously looking greyish brown caterpillar. (Fig. 279, S.S.I.)
Leaf and shoot folder.	Coimbatore and Northern Circars.	Caterpillar webs together leaves and top shoots.	*Eucosma critica*, Mey. (Eucosmid—moth).	Handpick webbed leaves and shoots.	A minor pest. The caterpillar is a short pale yellowish creature. (Pl. XXXIX, S.S.I.)
Leaf roller ...	In all red-gram tracts.	Caterpillar rolls the leaf-tips.	*Gracillaria soyella*, D. (Gracillariad—moth).	Hardly a pest	.....
Blue butterfly.	In all tracts	The larva feeds on the pods and flowers.	*Polyommatus boeticus*, L. (Lycaenid—butterfly).	A minor pest. Butterflies can be netted.	Small bluish butterfly with short stout fleshy larva. (Fig. 288, S.S.I.)
Scale insects...	Coimbatore and Northern Circars.	Infest shoots and stem in colonies and suck juice.	*Ceroplastodes cajani*, M. and *Lecanium longulum*, D. (Coccid—Scale insects).	Prune badly infested shoots and spray others with contact insecticide.	See Fig. 400, S.S.I.
Leafcutter bee.	All over South India.	Cuts pieces of tender leaves and carries the pieces to the nest.	*Megachile anthracina*, Gm. (Apidae—bee).	May be caught by nets or the leaves can be dusted with arsenates	This is also noted in plants like roses, cassia, etc., in gardens.
Bruchid ...	Coimbatore and Mysore.	Feeding and breeding on pods in fields.	*Bruchus theobromae*, L. (Bruchid—beetle).	Collect beetles with nets ...	One of the few pulse-beetles found in the field also.
Lab-lab bug ...	Coimbatore, Mysore and Northern Circars.	Sucking plant sap from tender parts.	*Coptosoma cribraria*, F. (Pentatomid—bug).	Collect bugs by nets ...	Small greenish bug found on lab-lab, pongamia in swarms, with a bad smell.
Verpuchi ...	South Arcot, Bellary and Coimbatore.	Grub of beetle bores into stem close to the roots.	*Sphenoptera perotteti*, G.L. (Buprestid—beetle).	Rarely a serious pest of red-gram, usually a pest of groundnuts; only preventives possible.	See under groundnut.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
			PULSES—*cont.*		
			BENGAL-GRAM (*Cicer arietinum*).		
Gram caterpillar.	Coimbatore, Ceded Districts and Northern Circars.	Eating leaves and the seeds by boring into pods.	*Heliothis obsoleta*, Fb. (Noctuid—moth).	Same as the one on red-gram (see above). Same control measures.	It is a major pest of Bengal-gram in South India. The pest is sometimes checked by parasitic wasps and dies.
			BLACK AND GREEN GRAMS (*Phaseolus radiatus* and *P. mungo*).		
Pod borer ...	All over South India.	Caterpillar damaging seeds.	*Maruca testulalis*, G. (Pyralid—moth).	Only preventive method of plucking off first attacked pods practicable in the early stages.	Found also on other grams and sunnhemp. Not a serious pest. (Fig. 305, S.S.I.).
Sphinx caterpillar.	Northern Circars and Coimbatore.	Defoliating the crop ...	*Herse convolvuli*, L. (Sphingid—moth).	Eggs and caterpillars which are very conspicuous on the plants can be hand-picked and destroyed; the infested fields may be ploughed up after harvest to kill underground pupæ.	Stout big caterpillar. Sometimes causes serious damage. (Fig. 272, S.S.I.)
Green leaf-caterpillar.	All over the province.	Feeding on leaves ...	*Azazia rubrican*, B. (Noctuid—moth).	A minor pest. In bad cases arsenates may be used.	Fig. 254, S.S.I.
Pod weevil ...	Coimbatore and Mysore.	Feeding on leaves and breeding in pods.	*Apion amplum*, F. (Curculionid—beetle).	Collect the beetles or dust plant with arsenate if serious.	Very small ant-like black insects, often bad on black-gram in Mysore.
Plant lice ...	All over the province.	Crowding on tender shoots and sucking the sap.	*Aphis sp.* (Aphid—plant-louse).	May be sprayed with a contact poison in valuable plots. Commonly checked by predators.	Colonies of the minute insect often cause some appreciable damage.

Leaf weevils ...	Coimbatore, Coorg, Ceded Districts, Salem, Tinnevelly, etc.	Feeding on the leaves and shoots.	*Alcides collaris*, P, *A. fabricii*, F. (Curculionid—weevils).	Collect weevils by the hand.	Rarely serious. (Figs. 197 and 195, S.S.I.)
Green-gram weevil.	Ceded Districts ...	Damaging the seeds ...	*Pachytychius mungonis*, M. (Curculionid—weevil).	No effective remedy known except preventive method of picking of attacked pods.	Also attacks daincha pods in Coimbatore. (Fig. 194, S.S.I.)
			HORSE-GRAM (*Dolichos biflorus*).		
Pod-borer ...	All over South India.	Caterpillar damaging seeds.	*Etiella zinkenella*, Tr. (Pyralid—moth).	Only preventive method of plucking off first attacked pods practically in the early stages.	Found also on other grams and sunnhemp. Not a serious pest. (Fig. 305, S.S.I.)
Leaf caterpillars.	Coimbatore, Ceded Districts and Northern Circars.	Feeding on foliage ...	*Azazia rubricans*, B (Noctuid-moth), *Nacoleia* (*Lamprosema*) *indicata*, Fb. (Pyralid—moth).	Generally of minor importance. Spraying or dusting with arsenates in serious attacks.	Sometimes occur as sporadic pests. (Figs. 254 and 310, S.S.I.)
Hairy caterpillar.	Mysore	Do. ...	*Diacrisia obliqua*, W. (Arctiad—moth).	Handpicking of leaves containing the gregarious larvæ.	Noted sometimes serious in Mysore.
			COW PEA (*Vigna catiang*).		
Stem fly ...	Coimbatore and Tinnevelly.	Maggots bore into stem of plants.	*Agromyza phaseoli*, Coq. (Agromyzid—fly).	No effective remedy known.	Similar to the red-gram pod fly in general appearance and habits. (Fig. 217, S.S.I.)
Plant lice ...	In all tracts ...	Sucking up the juice ...	*Aphis sp.* (Aphididae—bug).	May be sprayed with a contact poison in valuable plots; commonly checked by predators.	Colonies of this minute insect often cause some appreciable damage.
Blister beetles.	Do. ...	Feeding on flowers ...	The common spp. noted on cereals and *Cantharis setaceae*.	Handnet beetles ...	The last one was once found bad in Gōdāvari in 1919.
Blue butterfly.	In most tracts ...	The caterpillars bore into the seed capsules.	*Euchrysops cneyus*, F., and *Polyommatus boeticus*, L. (Lycaenid—butterflies).	Only preventive method, plucking off early attacked pods. The caterpillars may also be handpicked in early stages. The butterflies can be netted.	The caterpillars are soft and fleshy and the butterflies small and bluish, found often flying in the fields. (Pl. XXVI, Fig. 288, S.S.I.)

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		PULSES—*cont.*			
		Cow Pea (*Vigna catiang*)—cont.			
Leaf caterpillar.	In all tracts ...	Leaf feeding	*Azazia rubricans*, B. (Noctuid—moth).	Handpick caterpillars and spray stomach poison when needed.	A looper caterpillar occasionally found on most pulses. (Fig. 254, S.S.I.)
Pod bugs ...	Coimbatore and Malabar.	Sucking sap from pods and tender parts.	*Riptortus pedestris*, Fb., *R. linearis*, F., and *Anoplocnemis phasiana*, F. (Coreidae—bugs.)	Catch bugs with nets and destroy eggs laid on pods and leaves which can be easily seen.	Large-sized active bugs found on other pulses also. (Figs. 364 and 360, S.S.I.)
Stem-borer beetle.	Travancore ...	Larva boring into stem...	*Oberea sp.* (Cerambycid—beetle).	Destroy badly infested plants and beetles if found.	Minor pest.
		Field Bean (*Dolichos lablab*).			
Plant lice ...	In most tracts ...	Sucking up the juice ...	*Aphis medicagenis*, K. (Aphididae—bug).	Same remedy as in Cow pea plant-lice (see above).	The young shoots and vines are covered with these minute insects in bad attacks.
Do.	Do. ...	Do. ...	*Coptosoma cribraria*, F. (Pentatomid—bug).	The eggs and the adults can be easily collected and destroyed, the latter by handnets.	Small active greenish insects found in thousands on the tender vines, possess the usual buggy smell. (Fig. 345, S.S.I.)
Leaf weevil ...	Coimbatore, Ceded Districts and Northern Circars.	The insect defoliates the plant; sometimes seriously.	*Episomus lacerta*, F. (Curculionud—weevil).	Beetles to be collected by hand or by jerking over pan of water and kerosene.	A stout greyish weevil, sometimes numerous on the field bean crop (Fig. 184, S.S.I.)

Pod borer caterpillar.	Coimbatore and Northern Circars.	Caterpillar bores into the pod and eats the seeds.	*Adisura atkinsoni*, M. (Noctuid—moth).	Only preventive method feasible ; first attacked pods to be plucked off.	A cylindrical greenish caterpillar found during the cold weather, sometimes checked by parasites ; more or less like gram caterpillar in appearance.
Leaf-miner ...	Coimbatore, Malabar and South Kanara.	Minute caterpillar mines into leaf-tissue and feeds from inside.	*Cyphosticha coerulea*, Meyr. (Gracillariad-moth).	The blistered leaves to be picked off as a preventive.	The affected leaves show blistered white patches through which the small pink caterpillar is visible.
Sphinx caterpillar.	In all tracts ...	The long stout caterpillar eats the leaves.	*Acherontia styx* W. and *A. Lochesis* also sometimes. (Sphingid-moths).	The same measures as for green gram sphinx caterpillar (see above).	A stout built long green caterpillar with a horn above the tail region with golden yellow bands at sides ; found on gingelly and brinjal also. (Col. Pl. XXIV, S.S.I.)
Shoot borer ...	Coimbatore	The caterpillar bores into the young distal shoots.	*Laspeyresia torodelta*, Meyr. (Eucosmid—moth).	Clip first attacked shoots as a preventive.	A minor local pest.
Stem-weevil...	Coimbatore, Salem and North Arcot.	Larva causes galls in stems.	*Alcides pictus*, Boh (Curculionid—weevil).	Destroy first formed galls and the weevils seen on the plant.	Often a local pest in old vines.
Leaf hispid ...	Malabar and Tanjore	Leaf-feeding	*Platypria hystrix*, Fb. (Hispidae—beetle).	Collect beetles or dust arsenate on leaves.	A roundish small spiny insect like the hispa.
Stem boring chrysomelid.	Mysore and Coorg ...	Boring into stem and causing galls.	*Sagra nigrita*, Oliv. (Chrysomelid—beetle).	Remove first attacked vines as a preventive, or cut open the galls and destroy the grubs.	A shining green beetle with swollen hind legs. See Mysore Journal of the Agricultural Union, 1921, p. 16.
Thrips ...	Coimbatore and Northern Circars.	Swarming inside flowers and tender shoots.	*Taeniothrips distalis*, Ky. (Thripidae-thrips).	Spray with tobacco decoction.	The insect sometimes causes some harm ; see p. 256, Thy. Mem.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		FIBRE CROPS.			
		COTTON (*Gossypium herbaceum*).*			
Spotted boll-worms.	In all cotton areas ...	The caterpillars bore into top shoots of young plants and into the bolls of older ones.	*Earias fabia*, S. and *Earias insulana*, B. (Noctuid—moths).	Preventive methods alone practicable. Clip off shoots when they are attacked and pick off early attacked bolls to prevent further multiplication.	These are bigger caterpillars than the pink boll-worm and of a greyish green spotted appearance; attack young plants and also bolls. (Col. Pl. XXIII, S.S.I.)
Pink boll-worm.	Do. ...	The caterpillar bores into the bolls and feeds on the seeds.	*Platyedra gossypiella*, S. (Gelechiad—moth).	Preventive measures alone are practicable. Selection of healthy seeds for sowing and picking off early attacked bolls to prevent multiplication are the chief. The caterpillars are generally parasitized by wasps. Act according to Pest Act.	The small pink-coloured caterpillar is a serious pest of cotton in many cotton-growing countries of the world. (Col. Pl. XLII, S.S.I.)
Stem weevil ...	Coimbatore, Madura and Ramnad.	The grubs bore into the stem and cause galls.	*Pempheres affinis*, F. (Curculionid—weevil).	Preventive method alone practicable. Remove first attacked plants.	The insect is a small weevil and an important pest especially of cambodia cotton in and around Coimbatore (Figs. 198 and 199, S.S.I.)
Plant-lice ...	Coimbatore, Tinnevelly and Ceded Districts.	Suck the juice from the tender portions.	*Aphis gossypii*, G. (Aphidid—bug).	May be sprayed with a contact poison-like crude oil emulsion or fish oil soap.	Minute insects. Often cause appreciable injury to young cotton crop; ants visit them.

Leaf-roller ...	All over the province.	Caterpillars feed inside rolls of cotton leaves.	*Sylepta derogata*, Fb. (Pyralid—moth).	The leaf-rolls containing the caterpillars are conspicuous and can be collected and destroyed easily.	The insect is a green long caterpillar living in rolls of cotton leaf; found also on other malvaceous plants. (Col. Pl. XXXV, S.S.I.)
Dusky bug ...	In all cotton tracts.	Sucks the juice from seeds and stains the lint.	*Oxycarenus loetus*, K. (Lygaeid—bug).	Prematurely opening bolls should be collected early as they harbour the pest and all *kapas* containing the pest should be kept separate and fumigated.	Small dusky brown insect found crawling in numbers in open cotton bolls like ants. (Fig. 367, S.S.I.)
Red cotton bug.	All over the province.	Punctures the boll, sucks up the juice and stains the lint.	*Dysdercus cingulatus*, F. (Pyrrhocorid—bug).	Eggs and nymphs can be handpicked and the bugs shaken over a pan of water and kerosene.	A red and black insect found in numbers on isolated plants in all stages. (Col. Pl. XLVI, S.S.I.)
Semi-looper caterpillars.	In cotton tracts ...	Leaf-eaters	*Cosmophila indica*, G., *Tarache nitidula*, F., and *Acontia graellsi*, F. (Noctuid—moths).	Rarely serious. If bad, spray with arsenates.	Figs. 257, 243, 249, S.S.I.
Cotton bud-worm.	Coimbatore, Tinnevelly and Ceded Districts.	Feeds on the top shoot in a fold.	*Phycita infusella*, M. (Pyralid—moth).	The attacked top shoots which are easily seen to be clipped.	A small green caterpillar with black head, generally found on young plants. (Col. Pl. XXXI, S.S.I.)
Boll-boring noctuids.	Coimbatore	Boring into bolls ...	*Heliothis obsoleta*, F. and *Rabila frontalis*, W. (Noctuid—moths).	Very rarely found	The first is the notorious "American cotton boll-worm". Is chiefly a pest of pulses in India.
Stem-boring buprestid.	Ceded Districts ...	Larva boring into stem ...	*Sphenoptera gossypii*, K. (Buprestid—beetle).	Destroy first attacked stems.	Plate VIII, S.S.I.
Shoot weevil.	Coimbatore	Feeding and breeding on the shoots.	*Alcides affaber*, F. (Curculionid—weevil).	Handpick the beetles ...	Fig. 197, S.S.I.
Cotton blossom weevil.	Chingleput and Coimbatore.	Feeding inside the flowers.	*Amorphoidea arcuata*, M. (Curculionid—weevil).	Pick off and destroy badly infested flowers and destroy the weevils.	A very brown small weevil, not generally found as a pest. Closely allied to a very serious cotton pest in the Philippines. (*A. lata*, M.)

* Detailed information on cotton pests may be found in the author's bulletin on cotton insects in S. India. Agr. Deptt. Bull. No. 28.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
			FIBRE CROPS—*cont.*		
			COTTON (*Gassypium herbaceum*)—cont.		
Scales and mealy bugs.	Coimbatore, Tinnevelly, Ceded Districts, and Northern Circars.	Infest shoots and leaves and suck up plant sap.	*Saissetia nigra*, N., *Cerococcus hibisci*, Gr., *Pseudococcus virgatus*, C., *Pseudococcus corymbatus*, Gr., *Pulvinaria maxima*, Gr. (Coccidae—scales and mealy bugs).	Prune infested shoots and spray with contact insecticides.	For Figs. see S.S.I. 403 395 and Cocc. Bull. P.R. XXII and XIII.
Leaf-hopper ...	Coimbatore	Infest young plants in swarms and suck up plant sap causing leaf curls, bad on exotic cottons.	*Empoasca devastens*, D. (Jassid—bug).	Use the net and spray contact insecticide.	A small very active green leaf-hopper.
Surface weevil.	Tinnevelly and Ramnad.	Feeding on young plants and often causing some appreciable damage.	*Atactogaster finitimus*, F. (Curculionid—beetle)	Handpick weevils or dust arsenates on infested plants.	A stout greyish black weevil. (Fig. 191, S.S.I.)
Grasshoppers.	Coimbatore, Tinnevelly and Ramnad.	Feeding on tender plants and foliage.	*Cyrtacanthacris ranacea*, Gt., *Chrotogonus saussurei*, B., *Catantops annexus*, Bol., and *Aelopus tamulus*, F. (Acridiid—grasshoppers).	Trap with nets or poison baits.	Figs. 424, 422, S.S.I.
Hairy caterpillars.	Coimbatore and Tinnevelly.	Feed on the foliage ...	*Euproctis fraterna*, M. (Lymantrid—moth).	Same as the one on red-gram and same control measures to be adopted.	See under red-gram. Rarely the red hairy caterpillar *Amsacta* and the black hairy caterpillar. *Pericallia ricini*, Fb., are also found on cotton.

Bud fly ...	Coimbatore and Mysore.	Larvæ inside buds ...	*Dasyneura gossypii*, Felt (Cecidomyid—fly).	Of very minor importance.	A closely allied fly is a pest in America ; rarely seen in South India.
Flea beetles ...	Coimbatore	Eat the very tender seedlings.	*Monolepta signata*, Ol. (Haltricidae—beetle).	Net the beetles or dust with arsenate.	A very small white spotted flea beetle. (Fig. 159, S.S.I.)
Thrips ...	Coimbatore and Bellary.	In shoots and flowers ...	*Thrips tabaci*, L. (Thripidae—thrips).	Very rarely seen as a pest.	Serious on "Onions" and "Garlic". See p. 265, Thys. Mem.
Cotton mites ...	Coimbatore and Ceded Districts.	Colonies of these minute creature attack plant and cause reddening of leaves, curling up, etc.	Red spider, *Eriophyes sp.*	Dust powdered sulphur ...	*Not insects.*

GOGU (*Hibiscus cannabinus*).*

Hairy caterpillar.	Coimbatore, South Arcot and Chingleput.	Feeds on the tender parts.	*Euproctis scintillans*, W. (Lymantrid—moth).	Same measures as against the Tussock caterpillar on red-gram and cotton.	The caterpillar is similar to the red-gram and cotton one but with a yellow stripe along the dorsal surface. (Fig. 268, S.S.I.)
Stem weevil ...	Coimbatore and South Arcot.	Grub tunnels into stem, causes galls and often kills young plant.	*Alcides affaber*, F. (Curculionid—weevil).	Only prevention by pulling out attacked plants.	See Fig. 197, S.S.I.
Flea beetle ...	Malabar, South Kanara and Trichinopoly.	Biting holes in tender leaves.	*Nisotra madurensis*, J. (Chrysomelid—beetle).	Collect with nets or dust with arsenates.	Fig. 160, S.S.I.
Leaf weevil ...	Coimbatore and Tinnevelly.	Feeding on leaves ...	*Dereodus mastos*, Hb. (Curculionid—weevil).	Handpick the beetles ...	The beetle is a fairly big creature and of minor importance.
Blister beetle.	All over the province.	Chiefly on flowers ...	*Mylabris pustulata*, Th. (Meloid—beetle).	Same insect noted above on red-gram, etc., and same measures to be adopted.	See under red-gram.

* *Note.*—The red and dusky bugs of cotton and a few cotton leaf caterpillars also attack Gogu.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		FIBRE CROPS—*cont.*			
		SUNNHEMP (*Crotalaria juncea*).			
Hairy caterpillars.	Northern Circars, Coimbatore, South Arcot and Tinnevelly.	Caterpillars feed on leaves and bore into seed capsules.	*Utetheisa pulchella*, L. (Arctiad-moth), *Argina cribraria*, C., and *A syringa*, C. (Hypsid—moths).	Moths which are day-flying may be netted. A badly infested and valuable crop, may be sprayed with lead arsenate. In the early stages the caterpillars may be collected in trays of water and kerosene.	The first which is the commonest is a hairy caterpillar with red and orange spots. Sometimes it is serious during early summer (Fig. 233, S.S.I.)
Pod-borer ...	Northern Circars and Coimbatore.	Caterpillar bores into pods.	*Etiella zinkenella*, Tr. (Pyralid—moth).	Remove first infested pods to check multiplication.	Fig. 305, S.S.I.
Stem-borer ...	Northern Circars ...	Caterpillar bores into stem and causes swelling at the nodes.	*Laspeyresia tricentra*, M. (Eucosmidae—moth).	Only preventive method of cutting off attacked shoots practicable.	Not a serious pest. (Col. Pl. XL, S.S.I.)
Capsid ...	Northern Circars, Coimbatore and Tinnevelly.	The small insects suck the juice from tender parts.	*Ragmus importunitas*, D. (Capsid—bug).	Use hand-nets in early stages.	Not a serious pest. Small active green insects. (Fig. 378, S.S.I.)
Flea beetle ...	Do.	Biting small holes in foliage.	*Longitarsus belgaumensis*, F. (Halticidae—beetle).	Net the beetles or spray deterrent insecticide.	A very minute active insect found often in numbers.
Leaf caterpillar.	Northern Circars, South Arcot and Coimbatore.	Leaf eater	*Amyna octo*, G. (Noctuid—moth).	Rarely a pest	A green semi-looper caterpillar.
Blue butterfly.	All over the province.	Feeding on and boring into the pods.	*Polyommatus boeticus*, L. (Lycaenid butterfly).	Collect butterfly and hand-pick the larvæ.	Very rarely serious.

OIL-SEED CROPS.

Gingelly (*Sesamum indicum*).

Leaf and pod caterpillar.	Throughout South India.	Caterpillar feeds on the leaves and bores into the shoots and pods.	*Antigastra catalaunalis*, D. (Pyralid—moth).	No effective remedy known. In the early stages hand-picking will be found effective.	Often a bad pest of gingelly. (Col. Pl. XXXVII, S.S.I.)
Gingelly gall-fly.	Coimbatore and South Arcot.	The maggot injures the bud which forms a gall instead of a seed capsule.	*Aspondylia sesami*, F. (Cecidomyid—fly).	No effective remedy known.	The mal formed buds contain the pink maggots inside. (Figs. 224 and 225, S.S.I.)
Sphinx caterpillar.	Throughout South India.	Leaf and shoot eater ...	*Acherontia styx*, W. (Sphingid—moth).	Same as found on lab-lab...	See under lab-lab.
Gingelly bugs.	Ganjām and South Kanara.	Suck the juice from tender parts.	*Eusarcocoris ventralis*, W. (Pentatomid—bug). *Nysius inconspicuous*, D. (Lygaeid—bug).	Use of handnet will be very effective.	Small active bugs of two or three kinds found in swarms in the early summer months. (Fig. 349, S.S.I.)

Castor (*Ricinus communis*).

Semilooper caterpillar.	In all tracts; chiefly Ceded Districts.	Defoliates the plant ...	*Achoea janata*, L. (Noctuid—moth).	Handpicking of caterpillars. Spraying of lead arsenate if water is available and crop valuable. Dusting if no water available.	A major pest of castor. A smooth elongated greyish caterpillar moving in semiloops (Fig. 250, S.S.I.) called "Kondali hula" in parts of Mysore.
Tobacco caterpillar.	In all tracts ...	Do. ...	*Prodenia litura*, F. (Noctuid—moth).	Handpicking of eggmasses easy. Handpicking leaves containing hundreds of gregarious larvæ is also easy and effective.	A stout greyish brown caterpillar. It is a pest of tobacco and other plants. (Col. Pl. XIX, S.S.I.)
Seed capsule borer.	Do. ...	Caterpillar bores into seed capsules and leaf-stalks.	*Dichocrocis punctiferalis*, G. (Pyralid—moth).	Preventive method; first attacked shoots and top seed capsules to be clipped to prevent spread of pest.	Several seed capsules are found webbed together by the pest in an infested plant. (Col. Pl. XXXIV, S.S.I.)

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		OIL-SEED CROPS—*cont.*			
		CASTOR (*Ricinus communi*)—cont.			
Hairy and tussock caterpillars.	Coimbatore, South Arcot, Northern Circars and Mysore.	Defoliate the plants ...	*Orgyia postica*, W., *Euproctis fraterna*, M., *Pericallia ricini*, F. *Olene mendosa*, H., *and Diacrisia obliqua*, W. (Lymantrid and Arctiad—moths).	Same remedy as for tussock caterpillar on red-gram and gogu.	One or more species often appear as sporadic pests in the cold weather. (Figs. 263 and 264, S.S.I.)
Castor slug caterpillars.	West Coast, Coimbatore, Northern Circars and Madras.	Do. ...	*Parasa lepida*, G., and *Altha nivea*, W. (Limacodid—moths).	Clipping of leaves on which larvæ are found gregariously. Destruction of cocoons generally found in masses on the plant stem.	The first is an apple green slug-like creature, spiny and irritating to the touch, also found on mango and palms. (Figs. 283, 284 and 285, S.S.I.); the second rarely found. Noted in Mysore.
Butterfly ...	All over South India.	Leaf-eating caterpillar ...	*Ergolis merione*, Cr. (Nymphalid—butterfly).	Clipping the leaves on which the larvæ feed gregariously.	Rarely a pest. A green spiny caterpillar.
Mealy wing ...	Do.	Colonies found on leaf surface sucking sap.	*Trialeurodes ricini*, M. (Aleurodidae—bug).	Clip badly infested leaves and spray if necessary with contact insecticide.	The adults are very minute moth-like creatures.
Leaf-hopper ...	Coimbatore	Sometimes appear in swarms and suck sap.	*Empoasca flavescens*, F. (Jassid—bug).	Collect with handnets ...	Minute green leaf hoppers. (Fig. 387, S.S.I.)
Flea beetle ..	Do.	Biting holes on foliage ...	*Hermacophaga ruficollis*, L. (Halticidae—beetle).	Collect with nets or spray deterrent.	A very minor pest. A minute beetle.
Shot-hole borer.	Mysore	Larvae and adults boring into stem.	*Xyleborus fornicatus*, E. (Scolytid—beetle).	Cut and burn badly infested shoots and stems.	Sometimes found on tea (Fig. 204, S.S.I.)
Green plant-bug	Ceded Districts and Coimbatore.	Sucking sap from tender parts.	*Nezara viridula*, L. (Pentatomid—bug).	Handpicking	Found on numerous other crops.

GROUNDNUT (*Arachis hypogoea*).

Hairy caterpillar.	Throughout the Central and Coromandel districts of the province.	Completely eating up all parts of the plant.	*Amsacta albistriga*, Moore (Arctiad—moth).	Same as found on red-gram or cholam and the same remedies.	A very serious pest of groundnuts in S. India.
Surul puchi ...	South Arcot, Salem, Trichinopoly, Tanjore, Chingleput, etc.	The small caterpillar feeds on the foliage and does injury.	*Stomopteryx nerteria*, M. (Gelechiad—moth).	No effective remedy known; moths come to light in numbers and light traps may be tried to minimize damage.	A small greenish caterpillar does considerable damage to the foliage, called "*Surul*" or "*Mudu*" *puchi*. (Fig. 333, S.S.I.)
Gram caterpillar.	South Arcot and Chingleput, etc.	Feeds on the foliage ...	*Heliothis obsoleta*, (Noctuid—moth).	Same insect found on bengal and red-gram.	See under red-gram.
Thrips	Ceded Districts and South Arcot.	Tender shoots are sucked and dry up.	*Heliothrips indicus*, B. (Thripidae—thrips).	Spray with tobacco decoction or water with high pressure.	Often very bad causing "*Tamara novu*". (Thy. Mem. Fig. 1.)
Verpuchi ...	South Arcot, Chingleput and Tanjore.	The grub bores into the stem and kills the plant.	*Sphenoptera perotteti*, G. (Buprestid—beetle)	Preventive method alone practicable. Pull out attacked plants to prevent spread.	The white grub is found inside stem close to ground level. (Figs. 141 and 142, S.S.I.)
Leaf weevils ...	South Arcot and Coimbatore.	Feeding on leaves ...	*Myllocerus viridanus*, F. (Curculionid—weevil).	Collect with net	Generally a minor pest.
Semi-looper caterpillars.	South Arcot, Coimbatore and Guntūr.	Do. ...	*Plusia chalcytes*, F., *Plusia signata*, F. (Noctuid—moths).	Handpick or dust arsenates.	Rarely serious. (Fig. 259, S.S.I.)
Grasshopper ...	All over the province.	Feeding on and cutting young plants.	*Chrotogonus saussurei*, B. (Acridid—grasshopper).	Collect with nets or trap by baits.	Attack young plants generally.
Seed-sucking bug.	Ceded Districts, South Arcot and Kistna.	Sucking the freshly harvested pods in the threshing floor.	*Aphanus sordidus*, Fb. (Lygaeid—bug).	Collect with nets or cover harvested nuts to prevent attack.	Fig. 368, S.S.I.
Flower beetles.	Coimbatore and South Arcot.	Feeding on flowers and buds.	*Oxycetonia versicolor*, Fb. (Cetoniad—beetle), *Mylabris pustulata* and *Mylabris balteata* (Cantharid—beetles).	Handpick or net the beetles; they can also be driven by smoke.	Figs. 123, 149, S.S.I.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		OIL-SEED CROPS—*cont.*			
		SAFFLOWER (*Carathmus tinctorius*).			
Leaf caterpillar.	Coimbatore and Tinnevelly, etc.	Caterpillar feeds on the foliage.	*Perigoea capensis*, G. (Noctuid—moth). Occasionally the noctuid, *Heliothis peltigera*, Sch., is also found in Coimbatore.	The leaves containing the caterpillars may be hand-picked in the early stages. May be sprayed with lead arsenate.	Smooth stout green caterpillar appears sporadically as a pest. (Fig. 239, S.S.I.)
Lace-wing bug.	Coimbatore and Tinnevelly.	.....	*Monanthia globulifera*, W. (Tingidid—bug).	Rarely a pest	Fig. 371, S.S.I.
Plant lice ...	Do.	Suck up plant sap ...	*Macrosiphum solidaginis*, F. (Aphid—bug).	Spray with contact poison.	Sometimes bad.
		LINSEED (*Linum usitatissimum*).			
Leaf caterpillars.	Coimbatore	Caterpillars feed on the foliage.	*Grammodes stolida*, F., *Plusia orichalcea*, F. (Noctuid—moths).	Usually minor pests ; spray when bad with arsenate solution.	Both are semi-loopers, the first is black and red spotted in colour. (Figs. 251, 260, S.S.I.)
		VEGETABLES.			
		BRINJAL (*Solanum melongena*).			
Fruit and shoot-borer.	In all tracts ...	Boring into the top shoots and fruits.	*Leucinodes orbonalis*, G. (Pyralid—moth).	Attacked fruits and shoots should be clipped as a preventive.	A common pest of brinjal fruits ; pink caterpillar found inside fruits, attacks shoots of young plants. (Col. Pl. XXX, S.S.I.)

Stem-borer ...	Do. ...	Bores into the stem and often kills the plant.	*Euzophera perticella*, R. (Pyralid—moth).	Preventive only. Pull out and destroy first attacked plants.	Appears generally in old gardens where the plants have completed their yielding season. (Col. Pl. XXX, S.S.I.)
Epilachna beetles.	Do. ...	The beetles and the grubs scrape the green matter from the leaves.	*Epilachna 12 punctata*, M., *E. 28 punctata*, Fb. (Coccinellid—beetles).	Handpicking all stages and spraying or dusting with arsenates when bad.	Round spherical spotted beetles scraping the leaf surface. Found in all stages, also found on Cucurbitaceae. (Pl. XXX, S S.I.)
Lace-wing bug.	All over South India.	Colonies of this small insect suck the juice from tender portions.	*Urentius echinus*, D. (Tingidid—bug).	Handpicking of leaves infested with colonies of the insect in the early stages and spraying with crude oil emulsion when badly infested.	Small insects with the wings patterned like lace found in colonies on the backs of leaves. (Fig. 370, S.S.I.)
Brinjal mealy bug.	Chingleput and Coimbatore.	Colonies appear and suck the juice.	*Phenacoccus insolitus*, G. (Coccid—mealy bug).	Removal of the attacked plants is the best in the early stages. May be sprayed as above if many plants are attacked.	Appears generally on old plants late in the season. A bad attack on a plant appears as though the plant is whitewashed. (Pl. XXI, fig. 3, Cocc. Bull.)
Leaf-folding caterpillars.	Madras, South Arcot and Chittoor.	Feed inside leaf folds ...	*Eublemma olivacea*, W. (Noctuid—moth). *Phycita clientella*, Z. (Pyralid—moth).	By handpicking of the folds in infested plants the pest can be easily checked.	Short stout purple brown caterpillar with yellow spots and hairs. (Fig. 241, S.S.I.)
Brinjal bud-worm.	Coimbatore and Chingleput.	The small caterpillar bores into the bud and destroys it.	*Phthorimoea blapsigona*, M (Gelechiad—moth).	Only preventive method practicable, picking off and destroying early dropping buds.	Sometimes the insect causes appreciable damage. It is often parasitized by a wasp. (Fig. 317, S.S.I.)
Leaf webber ...	Malabar and South Kanara.	Webbing the leaves and living gregariously inside webbed leaves feeding on the same.	*Psara bipunctalis*, Fb. (Pyralid—moth).	Clip leaves containing the larvae.	
Sphinx caterpillar.	In all tracts	Caterpillar defoliates the plants.	*Acherontia styx*, W. (Sphingid—moth).	Same as on lab-lab and gingelly.	See under lab-lab and gingelly.
Leaf noctuid.	Madras, Coimbatore, Travancore and Bellary.	Leaf eater	*Plotheia nephelotis*, Meyr. (Noctuid—moth).	Handpick caterpillars or dust arsenates.	(Fig. 246, S.S.I. often found feeding gregariously.)

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		VEGETABLES—*cont.*			
		BRINJAL (*Solanum melongena*)—*cont.*			
Grey weevil ...	All over the province.	Feeding on the foliage ...	*Myllocerus subfasciatus*, G. (Curculionid—weevil).	Handpick the beetles ...	Commonly found, but rarely as a pest.
Small pentatomid.	South Kanara and Malabar.	Found in numbers on tender shoots sucking the sap.	*Coptosoma nazirae*, A. (Pentatomid—bug).	Handpick or net the bugs.	A small dark species found on other vegetables also.
The pulse coreid.	All over the province.	Sucking sap from tender portions.	*Anoplocnemis phasiana*, F. (Coreid—bug).	Catch bugs by nets ...	A conspicuous dark brown bug with stout hind legs.
		LADY'S FINGER ("BHENDAI") (*Hibiscus esculentus*).			
		All insects found on cotton except pink bollworm attack this plant, the chief are—			
Fruit borer ...	All over the province.	Caterpillars bore into shoots and fruits.	*Earias fabia*, S. (Noctuid—moth).	See under cotton	See under cotton.
Stem weevil ...	Do.	The grub bores into stem and shoots.	*Alcides affaber*, F. (Curculionid—weevil).	Do.	Do.
Leaf-roller ...	Do.	The caterpillars fold the leaves into rolls.	*Sylepta derogata* (Pyralid—moth).	Do.	Do.
Semi-looper caterpillars.	In cotton tracts ...	.....	*Cosmophila indica*, G. *Acontia graellsi*, F. (Noctuid—moths).	Do.	Do.
Leaf weevils.	Everywhere ...	Feeding on foliage ...	*Myllocerus viridanus*, Fb. (Curculionid—weevil).	Net the weevils. Not a serious pest.	Found also on groundnut, castor, etc.—A small greenish weevil.

CLUSTER BEANS (*Cyamopsis psoralioides*).

Leaf weevils ...	Coimbatore, Bellary, South Arcot, Madura and Chingleput.	Bores into top shoots and feeds on those portions.	*Alcides bubo*, F. *Blosyrus inacqualis*, B. (Curculionid-weevils).	Clipping off of top shoots of infested plants.	The first is a specific pest of Agathi (Fig. 196, S.S.I.). See under Agathi.
Lab-lab bug ...	Do.	Sucks up the juice from tender parts.	*Coptosoma cribraria*, F. sometimes also *C. nazirae*, At. (Pentatomid bugs).	Same as found on lab-lab ...	See under lab-lab above.

SWEET POTATO (*Ipomoea batata*).

Sweet potato weevil.	All over South India.	The vines are bored by the grub and damaged badly.	*Cylas formicarius*, Fb. (Curculionid—weevil).	No effective remedy known; attacked vines and tubers to be destroyed to check spread, growing of deep-rooted varieties, and leaving the field fallow for a season or two.	An ant like blue and red weevil, a major pest of the crop, found both in the field and in the stored tubers. (Col. Pl. XII, S.S.I.)
Sphinx caterpillar.	Coimbatore and Northern Circars.	Leaf-eater	*Herse convolvuli*, L. (Sphingid—moth).	Same one noted above on green-gram.	See under green-gram.
Stem-borer ...	Do.	Caterpillar bores into the vines.	*Omphisa anastomosalis*, G. (Pyralid—moth).	Same remedies to be adopted as for the weevil (Cylas).	Found also on other Ipomoeaceous plants. (Fig. 316, S.S.I.)
Leaf-folder ...	Coimbatore	Caterpillar feeds on leaves which are rolled up.	*Brachmea effera*, Meyr. (Gelechiad—moth).	Clip folded leaves. A minor pest only.	A very slender dark caterpillar.
Leaf noctuid ...	Coimbatore, Tinnevelly.	Feeding on leaves and shoots.	*Catephia inquieta*, W. (Noctuid—moth).	Hand pick caterpillars ...	Rarely a pest.
Tortoise beetles.	Coimbatore, West Coast, Madura, Mysore, etc.	Leaf feeders. Some breed on the foliage.	*Aspidomorpha miliaris*, F., *Metriona circumdata*, H. (Cassidid—beetles).	Handpick or net the beetles.	Yellow and green tortoise beetles. (Figs. 168, 170, S.S.I.)
Leaf hispid ...	Coimbatore	Feeding on leaves ...	*Oncocephala tuberculata*, Ol. (Hispid—beetle).	Of very minor importance.	A small spiny beetle.
Leaf butterfly.	Coimbatore, Tinnevelly.	Do. ...	*Junonia orithyia*, L. (Numphalid—butterfly).	Catch butterfly with net and handpick larvae.	Rarely a pest.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		VEGETABLES—*cont.*			
		SWEET POTATO (*Ipomoea batatu*)—*cont.*			
Hairy caterpillar.	Malabar	Feeding on leaves; sometimes bad.	*Diacrisia obliqua*, Wlk. (Arctiad—moth).	Handpick leaves on which larvae feed in numbers.	Sometimes a sporadic pest.
Leaf syntomid.	Travancore	Larva feeding on leaves.	*Euchromia polymena*, *L.* (Syntomid—moth).	Handpick the larvae ...	Of very minor importance; a black moth with orange and red markings.
		POTATO (*Solanum tuberosum*).			
The tuber-borer.	Nilgiris, Mysore ...	The caterpillar burrows into the tuber and damages it badly in stored tubers.	*Phthorimoea opercu-lella*, Z. (Gelechiad—moth).	It is more a pest of the stored tubers. Only prevention; fumigate or store the tubers in sand. In the case of plants pull out and destroy first attacked plants.	Found both in the field and in the stored tubers. A serious pest sometimes. (Col. Pl. XLIV, S.S.I.)
Leaf-caterpillar.	Shevaroys and Nilgiris.	Defoliates the plant and cuts seedlings.	*Euxoa segetum*, S. (Noctuid—moth).	Handpicking of caterpillars in early stages and trapping by poisoned baits when badly infested.	A stout dark brown caterpillar, generally found as a pest only in the hills and only serious at times. (Fig. 237, S.S.I.)
Epilachna beetle.	Mysore, Nilgiris and Coimbatore.	Defoliates the plants ...	*Epilachna* 12 *punctata*, *E.* 28 *punctata* (Coccinellid beetles).	See under brinjal	Brownish spotted beetles.
Green plant bug.	Shevaroys, Mysore ...	Sucks up sap from tender tissues.	*Nezara viridula*, *L.* (Pentatomid—bug).	Handpick the bugs, eggs and nymphs.	See under cumbu and castor.
Wire-worm ...	Nilgiris	Larva bores into the underground tubers.	*Drasterius sp.* (Elaterid—beetle).	Irrigate water mixed with contact insecticide.	Sometimes serious.

Ground beetles.	Nilgiris and Mysore,	Nibbling roots	*Gonocephalum hoffmanseggi*, St. also *Opatrum sp.* (Tenebrionid—beetles).	Collect beetles	(Fig. 143, S.S.I.)
Leaf-beetle ...	Nilgiris	Cutting holes in foliage.	*Chalaenosoma metallicum*, F. (Halticid—beetle).	Net beetles or dust the plants with arsenate.	Not a serious pest.

MORINGA (*Moringa pterygosperma*).

Hairy caterpillar.	Throughout South India.	Defoliates the plants ...	*Eupterote mollifera* Wlk. (Eupterotid—moth). *Pericallia ricini*, F. (Arctiad—moth).	Burning the swarms of caterpillars with a lighted torch or spray with arsenate.	The caterpillars of Eupterote are often found in thousands resting together on the plant stem; they are hairy and irritating. (Fig. 275, S.S.I.)
Leaf-caterpillar.	Coimbatore, Ceded Districts and Chingleput.	Folds the leaf and feeds from inside.	*Noorda blitealis*, W. (Pyralid—moth). *Actias selene*, H. is also sometimes found.	Handpicking the leaf folds is an easy method for this insect.	Not a very common pest; small greemish caterpillar of a blackish moth. (Fig. 318, S.S.I.)
Stem-borer ...	Coimbatore	Larva bores into stem ...	*Coptops asditicator*, F. (Cerambycid—beetle).	Cutting off first attacked stems and killing beetles when found; using borer solution if necessary.	Only occasionally found.

PUMPKINS, CUCUMBERS, GOURDS, ETC. (*Cucurbitaceae*).

(The insects affecting the different species of cucurbits are more or less the same.)

Pumpkin caterpillar.	Throughout South India.	Caterpillar feeds on the foliage.	*Margaronia indica*, S. (Pyralid—moth).	May be sprayed or dusted with a stomach poison in bad cases; otherwise handpicking of leaf-fold is easy and effective.	A bright green elongated caterpillar with a double white stripe on the body. (Fig. 312, S.S.I.)

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		VEGETABLES—*cont.*			
		PUMPKINS, CUCUMBERS, GOURDS, ETC. (*Cucurbitaceae*)—cont.			
Pumpkin leaf-beetles.	Throughout South India.	Beetles feed on the foliage.	Aulacophora—three species, *A. foveicollis*, Red, *A. atripennis*, Blue, and *A. stevensi*, Grey (Chrysomelid—beetles).	Collecting by nets. Dusting the plants with a stomach poison in bad cases.	These are active insects and sometimes cause appreciable damage to leaves of gourds, melons and pumpkins. (Figs. 161, 162 and 163, S.S.I.)
Epilachna beetle.	Do.	Beetles and grubs feed on foliage.	*Epilachna* 12 *punctata*, and *E.* 28—*punctata* (Coccinellid-beetles).	Same as that found on brinjal.	See under brinjal above.
Fruit flies ...	Do.	Maggots bore into the fruit pulp and damage the same.	Important species found are *Chaetodacus caudata*, B., *C. cucurbitae*, Coq and *Dacus brevistylus*, *B.* (melon fly.) (Trypetidae—fruit flies).	Prevention. Destruction of badly infested fruits. Spraying of plants with a sweetened poison to kill the flies may also be tried in bad cases.	Often bad on bitter gourds and melons. Found also in mango and other fruits. (Col. Pl. XVI, S.S.I.)
Snake-gourd semi-looper.	Do.	Feed on leaves; young vines often suffer badly.	*Plusia peponis*, F. (Noctuid—moth).	The leaf folds containing the caterpillars and pupae are conspicuous and can be easily handpicked.	A pale green semi-looper caterpillar, more or less confined to the snake gourd plant, rarely found on other cucurbits.
Pumpkin stem-borer.	Northern Circars and Coimbatore.	Grub bores into vines of the plants.	*Apomecyna pertigera* Th. (Cerambycid—beetle).	Preventive method only. Destruction of first attacked vines; also the destruction of adult beetle when found in the field.	Chiefly noted in the Northern Circars on the cucurbit called "*Dondekaya*" in Telugu. (Col. Pl. XI, S.S.I.)
Plant lice ...	All over South India.	Colonies suck plant sap ...	*Aphis malvæ*, K. (Aphidid-bug.)	In bad cases spray contact poison.	Predators often check it.

Bottle gourd plume moth.	Throughout South India.	The slender spiny caterpillar is a leaf eater.	*Sphenarches caffer*, Z. (Pterophorid—moth).	Clipping off infested leaves is an effective method.	Not a serious pest generally, appearance similar to red-gram plume moth. (Fig. 320, S.S.I.)
Snake-gourd weevil.	Tanjore	Attacking shoots and leaves.	*Baris sp.* (Curculionid—beetle).	Collect beetles	Minute black insect, sometimes causing appreciable damage.
Melon gourd weevil.	Ceded Districts ...	Larva and adult found boring into fruits.	*Acythopius citrulli*, M. (Curculionid—beetle).	Destroy badly infested fruits and weevils when found.	A medium—sized black weevil.
Plant bugs ...	Throughout South India.	The active bugs suck the juice from tender portions; sometimes found in swarms.	*Aspongopus janus*, F. and *A. brunneus*, Th. (Pentatomid—bugs).	Collect bugs with net ...	A reddish or greyish brown active insect with a bad smell found on pumpkins generally.
Bitter gourd gall-fly.	Coimbatore	Larva causing elongated galls in tender vines.	*Lasioptera falcata*, Felt. (Cecidomyiad—fly).	Clip off badly galled vines.	Not a serious pest.
		AMARANTHUS (*Amaranthus spp.*).			
Amaranthus weevil.	All over South India.	The grub bores into the shoots, tender portions of the stem and often kills the shoot.	*Lixus brachyrhinus*, B. (Curculionid—beetle).	Being a borer only preventives possible. Cutting off of attacked shoots and killing of the beetle when found on the plants.	Found on wild varieties of amaranthus also. (Fig. 189, S.S.I.)
Leaf caterpillar.	Do.	Caterpillar feeds on foliage.	*Hymenia fascialis*, C. (Pyralid—moth).	Handpicking of early attacked leaves. Netting and destruction of moth which is found in the fields.	Not a bad pest generally. Very common on grasses and other low—growing shrubs. (Fig. 307, S.S.I.)
		CHILLIES (*Capsicum spp.*).			
Chillies thrips.	All over South India, especially in the Guntūr district.	These minute insects suck the juice from shoots and make the tender leaves curl and fade.	*Scirtothrips dorsalis*, Hood (Thripidae—thrips).	Spraying with tobacco washes and dust with tobacco even in the nurseries to prevent multiplication.	Often a serious pest and found in company with plant—lice—a virus disease? (Thys. Mem. p. 251.)

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		VEGETABLES—*cont.*			
		CHILLIES (*Capsicum spp.*)—cont.			
Leaf caterpillar.	Northern Circars and Coimbatore.	Feeds on the leaves ...	*Laphygma exigua*, H. (Noctuid—moth).	Net the caterpillars if in numbers; dust arsenates if serious.	Occasional pest.
Chafer beetle.	Guntūr	Larvae attack roots of young plants.	*Cockchafer* (Melolonthid—beetle), not named.	Flood soil with insecticide mixed with water.	A local pest.
Stem-borer ...	Coimbatore and Northern Circars.	Caterpillar bores into stem.	*Euzophera perticella*, R. (Pyralid—moth).	See under brinjal	Not very common on chillies.
		ELEPHANT-FOOT YAM (*Typhonium sp.*).			
Leaf beetle ...	Malabar and Gōdāvari.	Larvae and adults feed on the leaves, the former gregariously.	*Galerucida bicolor*, H. (Chrysomelid—beetle).	Collect leaves containing larvae and net beetles.	Local pest; at times serious.
Sphinx caterpillar.	Coimbatore	Feeding on foliage ...	*Hippotion celerio*, L. (Sphingid—moth).	The stout caterpillars can be easily handpicked.	Found on grape vine also.
		COLOCASIA (*Colocasia spp.*).			
White spotted beetle.	Coimbatore and Northern Circars.	The beetle bites holes on the foliage and feeds on the same.	*Monolepta signata*, Ol. (Chrysomelid—beetle).	Netting the beetles will be found effective.	Fig. 159, S.S.I.
Tobacco caterpillar.	Tanjore, Coimbatore and Malabar.	Feeds on the leaves ...	*Prodenia litura*, F. (Noctuid—moth).	Same one found on castor...	See under castor, tobacco, etc.
Striped wing thrips.	Northern Circars and Tanjore.	Numerous adults and larvae suck up sap from foliage.	*Heliothrips indicus*, B. (Thripidae—thrips).	In bad cases spray with tobacco decoction.	A minor pest only; some one found on groundnuts.
Sphinx caterpillar.	Coimbatore, Malabar, Tinnevelly and Tanjore.	Feeding on leaves ...	*Hippotion oldenlandiæ*, F. (Sphingid—moth).	Caterpillars can be easily handpicked.	The adult is a stout greyish brown moth.

Curry-leaf Plant (*Murrayia koenigi*).					
Citrus butterfly.	All over South India.	Caterpillar feeds on leaves.	*Papilio demoleus*, L. (Papilionid—butterfly).	Eggs, caterpillars and pupae which are conspicuous on the plants can be collected and destroyed. The butterfly which is easily recognized can also be netted.	See under citrus plants on which the insect is a serious pest sometimes.
Shoot bug ...	Coimbatore and Malabar.	Minute insects infest tender shoots and leaves and suck the juice.	*Diaphorina citri*, Kuw (Psyllid—bug).	Clipping of attacked shoots and spraying of tobacco decoction.	Very small insects; sometimes do appreciable damage.
Onions and Garlic.					
Thrips ...	Coimbatore, Mysore, Ceded Districts, and South Arcot.	Covering foliage and making the plants blighted; often serious.	*Thrips tabaci*, L., *Heliothrips indicus*, B. (Thripidae—thrips).	Spray with tobacco washes in the early stages.	*Thrips tabaci* is a minute yellowish insect found in thousands in bad attacks; the other is not so commonly found. (Thys. Mem., p. 265.)
Leaf caterpillar.	Coimbatore, Ceded Districts, and Northern Circars.	Feeding on the foliage ...	*Laphygma exigua*, H. (Noctuid—moth).	See under chillies	Occasionally serious.
Tomato (*Lycopersicum esculentum*).					
Tobacco caterpillar.	All over the province.	Caterpillar feeds on leaves and bores into fruits.	*Prodenia litura*, F. (Noctuid—moth).	Same as on castor. Attacked fruits to be plucked and the worms hand-picked. (See under castor).	Sometimes found together with the gram caterpillar (*Heliothis*) boring into tomato fruits.
Epilachna beetles.	Do.	Grubs and beetles feed on the foliage.	*Epilachna 12 punctata*, M., *E. 28 punctata*, F. (Coccinellid—beetles).	Same as on brinjal	Sometimes bad on tomato.
Mealy bugs ...	Do.	Millions of these small creatures cover the plants and suck the juice.	*Pseudococcus virgatus*, F. (Coccid—mealy bug).	Removal of first attacked plants or spraying with crude oil or fish oil emulsion.	Whole plants are often covered with colonies of these white cottony insects. (Cocc. Bull. Pl. XXI-2.)
Eel worms ...	Coimbatore	Attacking roots and killing plants.	*Heterodera radicicola* (Nematode—Eel worms).	Destroy first attacked plants and try strong manures.	*Not insect.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		VEGETABLES—*cont.*			
		CABBAGE, CAULIFLOWER, RADISH, MUSTARD, ETC. (*Cruciferae*).			
		(The insects affecting these Cruciferae are more or less similar.)			
Cabbage borer.	On the hills, Coimbatore, and Mysore.	Caterpillar bores into the cabbage and also into the stem.	*Hellula undalis*, Fb. (Pyralid—moth).	Being a borer preventive methods more effective. Destroying or plucking off early attacked plants.	A greyish brown caterpillar. (Fig. 314, S.S.I.)
Mustard leaf-webber.	Coimbatore, Mysore, Ceded Districts, and Gōdāvari.	Caterpillar feeds on leaf and webs together the foliage.	*Crocidolomia binotalis*, Z. (Pyralid—moth).	Prevention by handpicking or destroying first attacked plants in early stages or use naphthalene emulsion.	Elongated greenish caterpillar found often bad on mustard and radish. (Fig. 313, S.S.I.)
Diamond back moth.	On the hills and elevated places generally.	The slender caterpillar feeds on cabbage, cauliflower, etc.	*Plutella maculipennis*, C. (Plutellid—moth).	Handpicking and destruction of attacked plants in early stages. Naphthalene emulsion may be employed in bad cases.	The caterpillar is a very slender pale green one and the moth has a diamond mark on its wings ; hence the name. (Fig. 340, S S.I.)
Flea beetle ...	Coimbatore	Cuts holes on the foliage.	*Phyllotreta downsei*, B. (Halticid—beetle).	Net the beetles or dust powdered tobacco on plants.	Minute bluish black beetle.
Mustard saw-fly.	On the hills, Gōdāvari delta, Mysore, Bellary, and Coimbatore during the cold weather.	The black worm like grub is a defoliator on all Cruciferae.	*Athalia proxima*, Kl. (Tenthredinidae—saw-fly.)	Same remedy as for the diamond-back moth, but handpicking is easier in this case.	This is the only wasp pest of any cultivated crop in South India. (Pl. II, Figs. 12 and 13, S.S.I.)

Cutworms ...	Hills, Mysore ...	Feeding on foliage ...	*Euxoa segetum*, Sch., Other cutworms such as *Agrotis C-nigrum*, L., are also found (Noctuid—moths).	Trap them with baits ...	Sometimes bad on the hills.
Cabbage bugs.	Throughout the province.	Suck up nutrition from tender parts of plants.	*Bagrada picta*, F. (Pentatomid—bug).	By handpicking and netting this pest can be easily checked.	Flattish red and black-spotted bug. (Col. Pl. II, Fig. 10, S.S.I.)
Thrips... ...	Ceded Districts and Coimbatore.	In colonies; sucks up the juice affects the growth of the plant badly.	*Thrips tabaci*, L. (Thripidae—thrips).	See under onion	Not so serious as on onions.

FRUIT PLANTS.

Mango (*Mangifera indica*).

Mango hopper.	Northern Circars, Salem, Mysore, Chittoor, etc.	The insects suck up the juice from the flower heads and make them drop.	*Idiocerus niveosparsus*, L., is the commonest; other two sometimes found are *I. clypealis*, L., and *I. atkinsoni*, L. (Jassid—bugs).	Spraying infested trees with Fish oil soap or crude oil emulsion three or four times at intervals of a week or ten days during the flowering season.	Number of these small active insects attack mango flower shoots during the cold weather and do considerable damage in certain years; called "*Honey dew*" disease of mango. (Fig. 384, S.S.I.)
Mango stem-borer.	All over South India.	The stout grub bores into the stem and often kills branches and stem.	*Batocera rubus*, L. (Cerambycid—beetle). Sometimes *Arbela tetronis*, M. (Zeuzerid—moth) also attacks mango stem.	Remove the grubs with a hooked wire; if impossible syringe into the bore a mixture of chloroform and creosote; this will kill the borer inside and will not affect the tree.	The beetle and grub are large-sized creatures, the former has long feelers and a hard body. (Fig. 179, S.S.I.)
Fruit flies ...	Do.	The white wriggling maggots burrow into the fruit pulp and spoil the fruits.	*Chaetodacus incisus*, W. and *C. ferrugineus*, Fb., appear to be the commonest of the species found in S. India.	Destroy infested and fallen fruits and spray foliage with sweetened poison to kill flies.	A serious pest of mango fruits almost every year. (Pl. XVI, S.S.I.)

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		FRUIT PLANTS—*cont.*			
		MANGO (*Mangifera indica*)—cont.			
Leaf caterpillars.	In different parts of the province.	Feeding on leaves exposed, rolling leaves from inside of webbing of leaves and shoots or by mining into leaf tissue and shoots.	Numerous species have been noted; the following are the chief:—Slug caterpillar, *Parasa lepida*, C. (Limacodid—moth). Tussock caterpillar, *Euproctis scintillans*. W. (Lymantrid—moth), Shoot webber, *Orthaga exvinacea*, M. (Noctuid—moth), Shoot webber and borer, *Chlumetia transversa* (Pyralid—moth), Leaf eater, *Bombotelia jocosatrix*, G. (Noctuid—moth), Leaf miner, *Acrocercops syngramma*, M. (Gracillarid—moth), Leaf eater, *Euthalia garuda*, M. (Nymphalid—butterfly).	Caterpillars may be hand-picked, the webbings and bored shoots clipped and in bad cases a stomach insecticide may be used.	Some of these only occasionally become serious and can be easily checked.
Leaf weevils...	Northern Circars, Chittoor, Chingleput, South Kanara, etc.	Different kinds feeding on the foliage either openly or in folds or the grubs of some mine into leaves.	*Apoderus tranquebaricus*, F. (leaf-twister), *Eugnamptus marginatus* (leaf-tip cutter), *Rhynchaenus mangiferae* (leaf-miner) (all Curculionid beetles).	Same remedy as for leaf caterpillars. The beetles may be jerked and destroyed over a pan of water and kerosene or leaf folds collected and destroyed.	Harmful to tender foliage. They are rarely serious. (Figs. 193, 186 and 192, S.S.I.)
Nut weevil ...	Salem, Coimbatore, Bangalore and Chittoor.	The weevil developing inside the nuts and sometimes damaging pulp.	*Cryptorhynchus mangiferae*, Fb. (Curculionid—beetle).	Destruction of beetles when found and proper disposal of mango nuts after use of fruit.	Affects some special varieties of fruits badly. (Fig. 200, S.S.I.)
Mango jewel beetle.	Vizagapatam and Coorg.	Larva sometimes bores into stem.	*Belinota prasina*, Th. (Buprestid-beetle).	Same as for the other stem-borer on mango. (See above).	A shining bluish black beetle. Not commonly seen.

Scales and mealy bugs.	Coimbatore, Vizagapatam, Bangalore, Salem and Chittoor.	Colonies of these cover shoots, leaves and fruits and suck up sap.	Many species are found, the following being important.—*Chionoaspis vitis*, Gr. *Phenacoccus mangiferae*, *P. iceryoides*, Gr. *Pulvinaria psidii*, M., *Lecanium adersi*, N. (Coccid-scales and mealy bugs).	Prune badly infested branches and spray with contact insecticides.	The mealy bugs sometimes cause serious damage. In many cases of injury by these insects ants are found visiting the infested leaves. For figures see Cocc. Bull. Pl. VI (1), Pl. XXIV, Pl. XXV and Pl. XII (1).
Shoot bugs ...	South Kanara and Malabar.	Numbers settle on tender shoots and suck up sap.	*Coptosoma nazirae*, A. (Pentatomid-bug).	Collect the bugs by hand or nets.	A minor pest on very young plants.
Red ant ...	West Coast tracts chiefly.	Builds nests on mango and other fruit trees and prevents men going up the trees.	*Oecophylla smaragdina* Fb. (Formicid-ant).	Burn nests with torches ...	Fig. 114, S.S.I.
			CITRUS (*Oranges, Lemons, Pomelos, etc.*)		
Citrus butterfly.	All over South India.	The caterpillar defoliates the plants often seriously.	*Papilio demoleus*, L. Another closely allied species, *P. polytes*, L. is also found with this butterfly.	Eggs, larvae and pupae are very conspicious on plants and can be easily hand-picked; in bad cases infested plants may be sprayed with stomach poison. The butterfly can also be netted.	See under "Curry-leaf plant" above. (Col. Pl. XXV, S.S.I.)
The fruit moth.	Northern and Circars Ceded Districts.	The moth pierces the fruits and makes them rot and drop down.	*Ophideres fullonica*, L. Allied species noted as a similar pest is *O. materna*, L. (Noctuid—moths).	Moths may be caught by sugary traps. Valuable fruits may be protected by cloth or wicker covering to keep off moths. Deterrents may also be sprayed to keep off moths from fruits.	Only example of the adult insect doing damage among the Lepidoptera; often a very serious pest.
Shoot and stem-borer.	Ceded Districts and Northern Circars.	Caterpillar bores into top shoots and stems showing galleries outside.	*Arbela tetraonis*, M. (Arbelid—moth).	Clipping attacked shoots and syringing as in mango stem-borer above.	Found as a bark or shoot-borer on different trees; the tubular gallery is seen outside on the tree stem.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		FRUIT PLANTS—*cont.*			
		CITRUS (*Oranges, Lemons, Pomelos, etc.*)—cont.			
Fruit flies ...	Nilgiris	Larvæ breed inside fruits.	*Chaetodacus spp.* (Trypetid—fly).	Trap flies by bait and destroy first attacked fruits.	Fruit flies on citrus are rare in South India so far.
Stem borer beetle.	Coorg, Mysore and Salem.	The beetle grub has the same habit as the mango stem borer.	*Chloridolum alcmene*, T. Sometimes also another very similar beetle. *Chelidonium cinctum*, G. (Cerambycid-beetles).	Same remedies to be employed as in the case of the mango stem-borer above.	The beetles are shining blue in colour, with long feelers. (Fig. 177, S.S.I.)
Citrus leaf miner.	All over South India.	The small caterpillar mines into the leaf-tissue and makes the leaf curl and fade.	*Phyllocnistis citrella*, S. (Lyonetiad—moth).	Picking off early attacked leaves; difficult to check when badly infested.	Sometimes all the leaves of the plant are found mined and curled up. (Fig. 341, S.S.I.)
Psyllid ...	Coimbatore	Swarm on the tender shoots and suck sap.	*Diaphorina citri*, K. (Psyllid—bug).	Collect adults and spray with contact insecticide.	Feeds also on Murrayia plant.
Plant lice ...	Coimbatore and Northern Circars.	Colonies of these dark insects cover young shoots and suck the juice.	*Aphis tavaresi*, D.G. (Aphidid—bug).	Clipping badly infested shoots and spraying with Crude oil emulsion or fish oil soap.	Sometimes a bad pest found covering all the tender shoots of a plant.
Shoot cricket.	Mysore	Cutting tender shoots ...	*Brachytrypes portentosus*, L. (Gryllid—cricket).	Trap them with baits and catch when seen.	(Fig. 430, S.S.I.) Known to injure Casuarina seedlings in Nellore.
Shoot butterfly.	Northern Circars and Coimbatore.	Small caterpillar found on tender shoots and leaves.	*Chilades laius*, C. (Lycænid—butterfly).	Clip infested leaves and collect butterflies with net.	A minor pest.

Orange thrips.	Mysore and Nilgiris.	On one occasion found covering and discoloring leaves and fruits badly in Mysore.	*Thrips sp.* One sp. found in small numbers in orange flowers on the Nilgiris is described by the author in his memoir as *Thrips nilgiriensis*, R.	Spray tobacco decoction early in the season.	The writer has not seen this insect noted from Mysore.
Leaf folder ...	In all tracts	Caterpillar folds the tender leaves.	*Tonica zizyphi*, St. (Oecophorid—moth).	Clip the folds	A minor pest. (Fig. 335 S.S.I.)
Mealy wings...	Nellore, Northern Circars and Coimbatore.	All stages of the insect infest tender parts and suck sap.	*Aleurocanthus spiniferus*, Qt. *Dialeurodes citri*, A., is also found occasionally) (Aleurodid-bugs).	Clip badly infested parts and spray contact insecticide.	Occasionally serious.
Shoot and fruit-sucking bugs.	Kurnool, Northern Circars and on the hills.	Sucking sap from tender shoots and fruits; the latter sometimes badly damaged.	*Vitellus orientalis*, D. *Cappœa taprobanensis*, D. (Pentatomid-bugs) and *Dasynus antennatus*, Vb. (Corcid-bug).	Collect bugs by hand or nets.	Local minor pests.
Citrus mite ...	Northern Circars and Coimbatore.	Covering leaves and sucking sap.	*Tetranychus hindustanicus*, H.	Spray or dust sulphur ...	*Not an insect.*
Scales, and mealy bugs.	Coimbatore, Northern Circars, Nilgiris, etc.	Colonies cover the tender parts and suck sap.	Scales include chiefly: *Icerya purchasi*, M., *Lepidosaphes becki*, N. } On the Nilgiris. *Lecanium viridis*, G. *Pulvinara psidii*, G. *Saissetia hemisphæricum*, T. *Pseudococcus corymbatus*, Gr. and *Parlatoriazizyphus*, L. (Coccid—bugs). } Everywhere especially on the hills.		Prune badly infected shoots and spray contact insecticides. Some of these cause serious damage at times. For fig. see Cocc. Bull. Pl. XXXI, XVII, XII and XXII.
GUAVA (*Psidium Guava*).					
Mealy scale ...	All over South India.	Colonies of the bug cover the leaves, suck the juice, and cover leaves with a sickly mould.	*Pulvinaria psidii*, Gr. (Coccid—mealy bug).	Clip badly infested leaves and spray Crude oil or Fish oil emulsion.	See also under mango and citrus for this insect. See Cocc. Bull. Pl. XII.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
			FRUIT PLANTS—*cont.*		
			GUAVA (*Psidium Guava*)—*cont.*		
Fruit fly ...	All over South India.	Maggots bore into and damage fruits.	Two or three species chiefly *Chaetodacus incisus*, W. (Trypetid—fly).	As under mango.	
Fruit moth ...	Northern Circars ...	Moths suck the fruits ...	*Ophideres fullonica*, L. (Noctuid—moth).	As under citrus	See under citrus.
Scales... ...	Coimbatore and Malabar.	Cover tender parts and fruits.	*Saissetia hemisphaerica*, T., *Lecanium viride*, Gr. (Coccid—scales).	As for mealy scale	Coce. Bull. Fig. 5, and Pl. XVII, Fig. 2.
			POMEGRANATE (*Punica granatum*).		
Fruit borer butterfly.	All over South India.	The caterpillar bores into the fruits and damages them.	*Virachola isocrates*, F. (Lycaenid—butterfly).	Damaged fruits to be picked off and good-fruits covered with loose muslin or paper bags to prevent attack by the butterfly. The butterfly can also be netted.	The caterpillar is a short dirty brown creature. Attacked fruits show small holes. (Fig. 289, S.S.I.)
Castor seed borer.	Coimbatore	Caterpillar bores into fruit.	*Dichocrocis punctiferalis*, G. (Pyralid—moth).	See under castor	Very rarely found serious.
Leaf caterpillars.	Northern Circars, Coimbatore, etc.	Feed on the foliage ...	*Parasa lepida*, Cr. (Limacodid—moth), *Euproctis fraterna*, M. (Lymantrid—moth), *Achoea janata*, L. (Noctuid—moth).	Handpicking in early stages and spraying with stomach poison in bad attacks.	See under castor for information regarding these insects.
Fruit bug ...	Kurnool	Sucking fruits	*Jurtina indica*, D. (Pentatomid—bug).	Collect bugs by nets ...	A minor pest.

Mealy wing ...	Coimbatore and Mysore.	All stages suck sap from tender parts.	*Siphonimus finitimus*, Silv. (Aleurodid—bug).	Spray with contact insecticide when bad.	Do.
Mealy bug ...	Coimbatore	Covering fruits in numbers and sucking it.	*Pseudococcus lilacinus*, Cock. (Coccid—mealy bug).	Do.	Sometimes bad (Pl.XXIII, Fig. 1—Cocc. Bull.)
Scale	Do.	On stem and shoots ...	*Aspidoproctus cinerea*, G.	Handpick scales and spray contact insecticide.	The insect is a stout giant scale and easily seen. (Cocc. Bull. Pl. XXIX, fig. 2.)
		GRAPE (*Vitis vinifera*).			
Flea beetle ...	Mysore, Salem, Coimbatore and Northern Circars.	The small beetle bites holes into tender leaves; often the foliage is badly eaten up.	*Scelodonta strigicollis*, M. (Chrysomelid—beetle).	Collecting beetles by hand-net and spraying or dusting infested plants with a stomach poison.	A small copper brown active beetle. (Fig. 158, S.S.I.)
Chafer beetles.	Coimbatore, Madras, Mysore and South Kanara.	The beetles come out at night and defoliate the vines often seriously.	Two species chiefly noted are—*Adoretus lasiopygus*, B., and *A. bengalensis*, B. (Rutelid—beetles).	Set up light traps and spray or dust with stomach poison as above.	These small brown beetles often come to light at dusk. (Fig. 127, S.S.I.)
Leaf sphingid.	Coimbatore and Mysore.	Feeding on leaves ...	*Hippotion celerio*, L. (Sphingid-moth).	Handpicking of caterpillars and eggs easy.	Rarely serious.
Leaf roller ...	Coimbatore, Mysore and South Kanara.	Rolls leaves and feeds on the same.	*Sylepta lunalis*, G. (Pyralid—moth).	Handpicking of rolls ...	Occasionally bad.
Leaf miner ...	Coimbatore, Madras, Mysore and South Kanara.	Mines in the leaf... ...	*Phyllocnistis toparcha*, M. (Lyonetiad—moth).	Clip badly infested leaves...	Do.
Grape thrips...	Coimbatore, Madura, Travancore, Mysore, Northern Circars, and Nilgiris.	All stages cover tender foliage and suck sap; sometimes serious.	*Rhipiphorothrips cruentatus*, H. (Thripid—thrips).	Clip badly infested leaves and spray tobacco decoction.	Found on roses also (Fig. 16, Thy. Mem.)
Scales ...	Coimbatore, Mysore, and Salem.	Colonies found sucking juice from shoots and leaves.	*Aspidiotus lataniae*, Sign, *Aspidiotus cydoniae*, C., *Lecanium longulum*, D., *Pulvinaria maxima*, Gr. (Coccid—bugs).	Do.	The leaves and vines are sometimes badly covered with one or more of these scales. (Cocc. Bull. Pl. VIII, fig. 1 and Pl. XIII.)
Vine girdler ...	Mysore and Coimbatore.	Rings the stems and often kills them.	*Sthenias grisator*, Fb. (Cerambycid—beetle).	Not easy to check. Catch beetles when found.	(Fig. 182, S.S.I.)

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		FRUIT PLANTS—*cont.*			
		GRAPE (*Vitis vinifera*)—cont.			
Ground beetle.	Mysore and Coimbatore.	Found on tender plants.	*Gonocephalum depressum*, Th. (Tenebrionid—beetle).	See under potato ...	See under potato.
Termites ...	Do.	Found on roots and plant cuttings.	*Odontotermes obesus*, R.? (Termitid—white ant).	See under sugarcane ...	Sometimes serious.
		MELONS.			
		(Chief insects affecting melons are those found on other cucurbitaceae.)			
		FIG. (*Ficus spp.* INCLUDING BANYAN, PEEPUL, ETC.).			
Stem-borer beetle.	Northern Circars and Coimbatore.	The grub burrows into the stem and often kills the shoot.	*Olenecamptus biolobus*, F. (Cerambycid—beetle).	Same remedy as in the case of the mango stem borer beetle.	The beetle is a slender pale white insect with very long feelers.
Leaf caterpillars.	Coimbatore, Bangalore and Trichinopoly.	Feeding on leaves often defoliating whole plant.	*Ocinara varians*, W. (Bombycid—moth) *Perina nuda*, Fb. (Lymantrid—moth) *Hypsa ficus*, Fb. (Hypsid—moth), *Phycodes radiata*, O. (Glyphipterygid—moth), *Margaronia stolalis*, G. (Pyralid-moths) and Glyphodes 2 or 3 spp. and *Plotheia celtis*, M. (Noctuid—moth).	Spray with arsenates in bad attacks of these larvae.	Occasionally serious. A very minor pest.

Scale insects and mealy bugs.	Northern Circars, and Coimbatore, Mysore.	Colonies sometimes cover shoots and fruits and suck up the juice.	*Saissetia oleae*, B., *Aspidiotus cydoniae*, Comst. *Pseudococcus lilacinus*, and *Lecanium ramakrishnæ*, G. Cock. (Coccid—scales and mealy bugs).	Spraying with a contact poison when serious.	See bulletin on Coccidae, Pl. XIV. (3), (Pl. VIII, Fig. 1), Pl. XXIII (1), and Pl. XVI (1).
Thrips ...	Northern Circars and Malabar.	Colonies crowd on tender parts and make leaves, curl.	*Gigantothrips elegans*, Z. (Phloeothripid—thrips).	Clip badly infested shoots and leaves.	A large-sized species of Thrips found on most spp. of ficus. (Fig. 11, Thys. Mem.)

PLANTAIN (*Musa sapientum*).

Stem-borer beetle.	Malabar and Ganjām.	The grub bores into the stem of the plant lower down and often kills the plant.	*Cosmopolites sordidus*, G. (Curculionid—weevil).	Only preventive; completely remove infested banana stump, don't leave stumps after the plantain bunches are cut. Collect beetles when found and destroy.	The insect is a medium sized dark beetle with a prominent snout and the grub pale white. (Fig. 201, S.S.I.)
Tobacco caterpillar.	Malabar, Tanjore and Gōdāvari.	Feeding on leaves ...	*Prodenia litura*, F. (Noctuid—moth).	Cutting off infested leaves will alone be quite effective.	
Other caterpillars.	Northern Circars, Malabar and South Kanara.	Do. ...	*Parasa lepida*, Fb. Slug, (Limacodid—moth) *Pericallia ricini*, F. (Arctiad—moth).	Do.	See Fig. 232 "*Pericallia*" is a black hairy caterpillar.
Lace wing bug.	Northern Circars and Malabar.	Sucking tender foliage ...	*Stephanitis* (*Cadamastus*) *typicus*, D. (Tingidid—bug).	Rarely serious	Minute bugs with lace like wings.
Scale insects.	Nilgiris (Walayar), Gōdāvari, and Tinnevelly.	Sucking tender tissues ...	*Aspidiotus destructor*, Sign, *A. cyanophylli*, S. and *Lecanium descrepans*, Gr. (Coccid—bugs).	Not serious pests generally found on fruits.	See Cocc. Bull. Pl. VII, Fig. and Pl. VII, fig. 3.
Spittle insect.	South Kanara, Coorg and Malabar.	Do. ...	*Phymatostetha deschampsi*, L. (Cercopid—bug).	Collect by nets	A black and red insect; rarely a pest though often found in numbers.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		FRUIT PLANTS—*cont.*			
		JAK (*Artocarpus integrifolia*).			
Shoot borer caterpillar.	Gōdāvari, Malabar and South Kanara.	The caterpillar bores into tender shoots and buds.	*Margaronia czesalis*, W. (Pyralid—moth).	Preventive. Clip off and destroy all infested and rotten tender shoots to check spread.	When serious several buds drop. (Fig. 311, S.S.I.)
Jak bud weevil.	Mysore and Malabar.	Grub bores into the tissue of young fruits.	*Ochyromera artocarpi*, M. (Curculionid-weevil).	Same remedy as above; badly infested tender fallen fruits to be collected and destroyed to check spread.	A small grey brown weevil. Not found so far outside the Mysore uplands and West Coast.
Jak aphid ...	Do.	Colonies suck sap from shoots.	*Greenidea artocarpe*, W. (Aphidid-bug.)	Cut badly infested shoots.	
Mealy bugs ...	Nilgiris foothills and Malabar.	Covering soft parts and sucking juice.	*Icerya aegyptiaca*, D. *Pseudococcus corymbatus*, Gr. (Coccid—mealy bug).	Sometimes serious and attended by swarms of ants. Spraying with a contact insecticide.	Pl. I, fig. 4. Cocc. Bull.
Jak spittle insects.	Coorg and Mysore hill tracts.	Sometimes found in numbers and doing appreciable damage.	*Cosmoscrata relata*, Dt. (Cercopid—bug).	One or two other species. *Ptyelus sp.* and *Clovia, lineaticollis* are also found on jak in Malabar.	A minor pest only.
Jak scale ...	Mysore	Covering leaves and twigs in swarms and sucking sap.	*Aspidiotus triglandulosus*, Gr. (Coccid-bug).	Sometimes serious and attended by swarms of ants. Syraying with a contact insecticide.	Minute ashy black scales. Generally clustering along the leaf ribs. (Pl. X, fig. 1, Cocc. Bull).
		BREAD FRUIT TREE (*Artocarpus incisa*).			
Mealy bugs ...	West Coast	Covering tender shoots and sucking sap.	*Icerya aegyptiaca*, D. (Coccid—bug).	Sometimes serious and attended by swarms of ants. Spraying with a contact insecticide.	Sometimes bad covering shoots in white masses. Pl. I, fig. 4 Cocc. Bull.

TAMARIND (*Tamarindus indicus*).

Scale insects...	Coimbatore, South Arcot, Tinnevelly and Mysore.	Colonies cover fruits and leaves and suck up sap; fruits suffer badly.	*Aspidiotus orientalis*, N. *A. tamarindi*, G. (Coccid—scales).	Prune heavily infested parts and spray with contact insecticide.	*A. tamarindi* has been noted chiefly in Coimbatore, see Pl. VIII (2). Cocc. Bull.
Mealy bugs ...	Coimbatore	White masses cover fruits and leaves.	*Pseudococcus bilacinus*, C. (Coccid—mealy bug).	Do.	(See Pl. XXIII, fig. 1, Cocc. Bull).
Crab caterpillar.	Do.	Feeding on shoots and leaves.	*Stauropus alternus*, W. (Notodontid—moth).	Handpick the caterpillars.	Occasionally bad. See under redgram.
Bag worms ...	Do.	Do.	Not named (Psychid—moth).	Pick off the bags containing the larvæ or poison leaves with arsenate.	Sometimes sporadic.

WOOD-APPLE (*Feronia elephantum*).

Slug caterpillar.	Coimbatore, Mysore and South Arcot.	Feeding on leaves ...	*Parasa lepida*, Cr. (Limacodid-moth).	See under castor	Occasionally serious.
Fruit borer ...	Coimbatore	Larvae bore into fruit and feed on contents.	*Euzophera plumbei fasciella*, H. (Pyralid—moth).	Destroy first attacked fruits.	Rarely serious.

NELLI (*Phyllanthus emblica*) Gooseberry?

Fruit bug ...	Northern Circars ...	Sucking fruits	*Scutellera nobilis*, F. (Pentatomid—bug).	Handpick or net the bugs and nymphs.	Noted as a local pest only.
Mealy bug ...	Madras and South Arcot.	Covering shoots and leaves in white masses.	*Pseudococcus sp.* (Coccid—mealy bug).	Prune badly infested parts and spray contact insecticide.	Sometimes a mealy-wing is also seen on the leaves.
Leaf roller ...	Madras and Malabar.	The small caterpillar feeding inside leaf rolls.	Not named. (Microlepidoptera).	Clip rolled leaves	A minor pest.

EUGENIA (*Eugenia jambulana*).

Leaf caterpillar.	Mysore and Coimbatore.	Feeding on foliage ...	*Carea subtilis*, W. (Noctuid—moth).	Collect caterpillars by hand.	Rarely serious. Caterpillar has the anterior part of the body conspicuously swollen.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		FRUIT PLANTS—*cont.*			
		EUGENIA (*Eugenia jambulana*)—cont.			
Fruit-fly ...	Ceded Districts, Northen Circars and Coimbatore.	Maggots burrow into fruit pulp.	*Bactrocera correctus* in Godavari. (Trypaenid—fly).	Destroy badly infested fruits.	Sometimes bad.
Mealy wings...	Northern Circars, Coimbatore and Mysore.	Colonies cover shoots and tender leaves and suck sap.	*Dialeurodes eugeniae*, M. (Aleurodid—bug). Sometimes a Psyllid (*Trioza sp.*) is also noted on Eugenia.	Clip badly infested shoots and if necessary spray with contact insecticide.	A minor pest.
		JUJUB (*Zizyphus jujuba*).			
Fruit borer ...	Ceded Districts, Coimbatore and Mysore.	The reddish caterpillar bores into the fruit pulp.	*Meridarchis scyrodes*, M. (Carposinid—moth).	Same remedy as for fruit flies on mango, pumpkin, etc., see above.	The fruit fly maggot and this reddish caterpillar are often found together.
Fruit-fly ...	Do.	The maggot burrows into the pulp of the fruit.	*Carpomyia vesuviana*, B. (Trypetid—fly).	Same remedy as for the fruit borer above.	This fruit fly is different from all others noted before. It is confined to this plant in Southern India. It is smaller in size also.
Hairy caterpillar.	Coimbatore	Swarms of caterpillars feed on the foliage.	*Thiacidas postica*, W. (Lymantrid—moth.)	Prune badly infested branches and spray arsenate.	Sometimes bad.
Leaf butterfly.	All over Southern India.	The small fleshy larva feeds on the foliage.	*Tarucus theophrastus*, F. (Lycaenid—butterfly).	Rarely bad	Ants visit these caterpillars.
Leaf weevil ...	Coimbatore	Feeding on foliage ...	*Myllocerus transmarinus*, Hb (Curculionid—weevil).	Shake the branches when the beetles will drop and then collect and destroy them.	Fairly large beetle.

Leaf hispid ...	Do. ...	Larvae and adults feed on the foliage.	*Platypria andrewesi*, W. (Hispid—beetle).	Shake the branches when the beetles will drop and collect leaves containing the larvæ.	Small spiny beetle.
Scale insects...	Bellary and Coimbatore.	Colonies cover leaves and shoots and suck sap.	*Ceroplastodes cajani*, M. *Pulvinaria maxima*, Gr. (Coccid—scale insects).	Prune badly infested shoots and spray contact insecticide.	Sometimes bad for (figures Pl. XV-2 and Pl. XIII, Cocc. Bull).

CUSTARD APPLE (*Anona squamosa*).

Mealy bug ...	Coimbatore, South Arcot, Malabar and Anantapur.	Colonies cover the tender portion and suck sap.	*Pseudococcus virgatus*, C., *P. lilacinus*, C. (Coccid—mealy bugs).	Spray with contact insecticides after pruning the badly infested parts.	Sometimes very serious covering whole fruits and stalks.
Fruit borer ...	All over Southern India.	Caterpillar bores into the fruits.	*Heterographis bengalella*, R. (Pyralid—moth).	Destroy first attacked fruits.	A minor pest.
Fruit-fly ...	Coimbatore and Anantapur.	Maggots bore into fruits.	*Bactrocera persicae*, B. (Trypetid—fruit-fly).	Do.	Sometimes bad.

COUNTRY ALMOND (*Terminalia catoppa*).

Leaf beetle ...	Throughout Southern India.	The leaves are twisted by the creature into knots and the larvae develop in these.	*Apoderus tranquebaricus*, F. (Curculionid—beetle).	Clip off the knotted and twisted leaves and kill beetles when found.	Occasionally numerous, but easily checked.
Scales ...	Coimbatore, Mysore and South Arcot.	Colonies of young and adult cover tender parts and suck plant sap.	*Saissetia nigra*, N., and *S. hemisphaerica*, T. (Coccid—scales).	Prune badly infested parts and spray contact insecticide.	Sometimes bad.
Thrips ...	Coimbatore and Malabar.	Colonies cover tender parts and suck up sap.	*Rhipiphorothrips cruentatus*, H. (Thripidae—thrips).	Prune badly infested leaves.	A minor pest found on grape and rose also. Thy. Mem. p. 252 and fig. 16.

CASHEW (*Anacardium occidentale*).

Thrips ...	Malabar	Cover foliage and shoots and blighten the surface.	*Selenothrips rubrocinctus*, G. Thripidae—thrips).	Clip badly infested parts and spray with tobacco decoction.	Sometimes a serious pest. Attacks cacao.
Leaf caterpillar.	Do.	Feeding on foliage ...	*Cricula trifenestrata*, H. (Saturnid—moth).	Spray with arsenate if bad.	A big brown moth found on pepper leaf also.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		FRUIT PLANTS—*cont.*			
		CASHEW (*Anacardium occidentale*)—*cont.*			
Leaf capsid ...	Cochin, Malabar ...	Sucking sap from tender parts.	*Helopeltid antonii*, S. (Capsid—bug).	Net bugs when found ...	Attacks tea.
Shoot weevil...	South Kanara, Mysore.	Feeding on shoots and buds.	*Apion amplum*, F. (Curculionid—weevil).	May be easily handpicked and netted.	Small dark insect.
Scale insects ...	Do.	Covering tender parts and sucking sap.	*Ceroplastes floridensis*, C. (Coccid—bug).	Clip leaves with the scales.	Waxy oval scales easily seen. Coco. Bull., p. 40.
		SAPOTA (*Achras sapota*).			
Leaf hoppers.	Northern Circars ...	As on mango	*Idiocerus niveosparsus*, and allied spp. (Jassid—bugs).	See under mango	Not so serious as on mango.
Mealy bugs ...	Do. ...	Covering shoots and stalks and sucking sap.	*Phenacoccus iceryoides*, Gr., *Pseudococcus lilacinus*, F. (Coccid—bugs).	Prune badly infested shoots and spray with contact insecticides.	Occasionally serious. Coco Bull., Pl. XXV and XXIII.
		PINE APPLE (*Ananas sativus*).			
Mealy bug ...	North Malabar ...	Colonies of small white reddish insects suck the juice from the fruits.	*Pseudococcus bromeliae*, B. (Coccid—mealy bug).	Destroy badly infested apples.	Rather new to India.
		MULBERRY (*Morus sp.*).			
Stem girdler.	Coimbatore	Beetle rings the stem and often kills it.	*Sthenias grisator*, F. (Cerambycid—beetle).	Destroy infested stems and Kill beetles when found.	See under grape.

BAEL OR BILWA (*Aegle marmelos*).

Leaf beetle ...	Coimbatore and Malabar.	Grubs and beetles defoliate plants often badly.	*Clitea indica*, J. (Chrysomelid—beetle).	Clip leaves containing gregariously feeding grubs and if necessary dust or spray arsenate.	A small dark shining beetle with orange-yellow grubs.
Scale insects.	Do.	Colonies cover leaves and suck up sap.	*Lecanium viride*, Gr. (Coccid—scale).	Prune badly infested shoots and spray contact poison if necessary.	See under citrus, coffee (Plate XVII, Fig. 2, Coccid bulletin.)

APPLES, PEARS AND ALLIED FRUITS (*Pyrus spp.*).

Wooly blight.	Nilgiris, Shevaroys and Mysore.	Colonies of these small insects attack the roots and stem and cause galls.	*Eriosoma lanigera*, H. (Aphidid—bug).	Remove and destroy badly infested parts and spray the plants.	An introduced pest found only on the hills so far; very bad sometimes. (Fig. 389, S.S.I.)
Plant-lice ...	Nilgiris and Shevaroys.	Colonies cover shoots and suck plant sap.	*Dilachnus krishni*, G. (Aphidid—bug).	Spray contact insecticide.	Sometimes bad.
Leaf weevil ...	Mysore	Feeding on foliage ...	*Myllocerus subfasciatus*, G. (Curculionid—beetle).	Handpick or net beetles ...	Not very serious generally.
Scales ...	Do.	Colonies suck sap ...	*Aspidiotus cydoniae*, C. (Coccid—scales).	Prune badly infested shoots and spray contact insecticide.	Also found on Fig. (Plate VIII (1), Cocc. Bull.)

PEACH, PLUM (*Prunus spp.*).

Fruit flies ...	Nilgiris	Maggots bore into fruits.	Chiefly the species—*Chaetodacus ferrugineus*, B. (Trypaenid—fly).	Destroy first attacked fruits and trap flies by poisoned syrup spray.	Bad on the Nilgiris fruit farms. See under mango, guava, etc.

DYES, DRUGS, SPICES, NARCOTICS, ETC.

INDIGO (*Indigofera arrecta*).

Leaf weevil ...	Ceded Districts, Tinnevelly, South Arcot, Coimbatore.	The weevil and grubs feed and breed on the tender shoots.	*Alcides bubo*, F. (Curculionid—beetle).	Beetles may be collected and infested shoots pruned.	Attacks agathi and cluster beans.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		DYES, DRUGS, SPICES, NARCOTICS, ETC.—*cont.*			
		INDIGO (*Indigofera arrecta*)—*cont.*			
Indigo psylla.	Ceded Districts, Tinnevelly, South Arcot, Coimbatore.	The small insects suck the juice in numbers and make the shoots and leaves curl and fade.	*Arytaina punctipennis*, Cr. = (*P. isitis*, B.) (Psyllid—bug).	Spray contact insecticide when bad.	Pl. XLVII, S.S.I.
Leaf caterpillars.	Do. ...	Feed on the leaves ...	More than one species noted; chief are—*Laphygma exigua*, H., *Plusia orichalcea*, F. (Noctuid—moths) *Dichomeres ianthes*, M. (Gelechiad—moth).	Handpick caterpillars or spray arsenate if pest is bad.	These are not commonly serious in South India.
		NUNA (*Morinda tinctoria*).			
Scales ...	Coimbatore	Cover leaves and cause blight.	*Aspidiotus orientalis*, N., *Lecanium viride*, S. *Pulvinaria psidii*, M. (Coccid—bugs).	Cut badly infested branches and spray contact insecticide.	Sometimes the scales do severe damage. Cocc. Bull., Pl. XII (1).
Shoot beetle...	Do.	Larvae bore into shoots and kill them.	*Hypothenemus plumeriae*, N. (Scolytid—beetle).	Prune infested shoots ...	During certain seasons numerous shoots are found dry and drooping due to the attack of this insect.
Sphinx caterpillars.	Do.	Feed on the leaves ...	*Macroglossa vialis*, B. and other *spp.*; also *Rhopalopsyche bifasciata*, B. (Sphingid—moths).	Handpick larvae which are stout and conspicuous.	Pretty and active moths.

TURMERIC (*Curcuma longa*) AND ARROW-ROOT.

Shoot borer ...	All over South India.	The caterpillar bores into the growing shoot and often kills it.	*Dichocrocis punctiferalis*, G. (*Pyralid*—moth).	Only prevention. Destruction of attacked shoots. Same as the insect attacking castor seed capsules.	See under "castor" above.
Turmeric butterfly.	Do. ...	The caterpillar feeds on the leaves often inside folds.	*Udaspes folus*, Cr. (Hesperiad—butterfly).	Handpicking of the caterpillars and pupae inside leaf folds very easy and effective. The butterflies can also be netted and destroyed.	A stout greenish caterpillar with dark head; butterfly is white and black spotted. (Fig. 285, S.S.I.)
Scale	Salem	Colonies of the scale cover the underground haulms and makes them fade.	*Aspidiotus hartii*, C. (Coccid—scale).	Mix irrigation water with contact insecticide; use insect-free seeds.	Sometimes serious.
Lace-wing bug.	All over South India.	Colonies of these small insects suck the juice from the leaves.	*Stephanitis typicus*, D. (Tingidid—bug).	Handpicking of leaves containing colonies, or in bad attacks spray leaves with a very dilute solution of crude oil emulsion.	Very small insects found in colonies on the back of the infested leaves. Same kind of insects as brinjal lace-wing bug noted under brinjal. (Fig. 369, S.S.I.)
Thrips ...	Chittoor, Malabar, Cuddapah and Travancore.	Swarm on tender parts and suck sap.	*Panchaetothrips indicus*, B. (Thripid—thrips).	Net the creatures and spray with tobacco washes if necessary.	Active little insects sometimes found in numbers. Fig. 23. Thys. Mem.

GINGER (*Zingiber officinalis*).

Shoot borer ...	Malabar	Larva bores into shoot and often kills it.	*Dichocrocis punctiferalis* G. (Pyralid—moth)	As in turmeric	See under turmeric and castor.
Fly	Do.	Maggot found in rotting ginger.	Two species are noted: *Calobata sp.* (Micropesid—fly), *Formosina flavipes*, M. (Chloropid.—fly).	Destroy first attacked plants with the maggots.	Found also on turmeric; status doubtful.

CUMMINS, CORIANDER, ANISEED, ETC.

Leaf caterpillar.	Coimbatore and Northern Circars.	Feeding on leaves and tender buds.	*Laphygma exigua*, H. (Noctuid—moth).	Same as noted on onion ...	See under "onion" above.
Flower-head bug.	Northern Circars ...	Sucking the juice from flower buds.	*Agonoscelis nubila*, F. (Pentatomid—bug).	Checked easily by netting the insects.	Not serious generally. (Fig. 351, S.S.I.)

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
			DYES, DRUGS, SPICES, NARCOTICS, ETC.—*cont.*		
			PEPPER (*Piper nigrum*).		
Flea beetle ...	Malabar	The small grub of the beetle bores into the green pepper berry.	*Longitarsus nigripennis*, M. (Chrysomelid—beetle).	Spraying of some deterrent which will keep away the beetle.	A small red and black insect found scraping leaves and berries of pepper.
Scales ...	Malabar and Travancore.	Scales suck the juice from the vine and shoots and are found in thousands on the vines.	*Lepidosaphes piperis*, G., *Pinnaspis aspidistroe*, S. (Coccid—Scales).	Removal of badly infested vines and in bad cases spray with a strong contact poison like "resin compound".	Colonies of these small boat-shaped scales sometimes completely cover the pepper vines and leaves killing them in some cases. (Fig. 1, Cocc. Bull.)
Mealy bug ...	Malabar	White masses of these insects sometimes cover leaves and shoots.	*Pseudococcus virgatus*, C. (Coccid—mealy bug).	Prune and spray with contact washes.	See under tomato, custard apples, etc. Pl. XXI (2), Cocc. Bull.
Leaf caterpillar.	Do.	Feeding on foliage; does not damage pepper as it does the standard on which pepper twines.	*Cricula trifenestrata*, H. (Saturnid—moth).	See under cashew	Often heavily parasitised.
			BETEL VINE (*Piper betel*).		
Betel-vine bug.	South Kanara, Bellary and Kurnool.	The bugs suck the juice from tender leaves which curl up and fade.	*Disphinctus politus*, W. (Capsid—bug).	No effective remedy known; in the early stages the first attacked leaves which may contain eggs may be clipped off to prevent spread; if possible the bugs found flying may be netted or caught by sticky boards.	Belongs to the same group as the cholam ear-head bug but is reddish brown in colour. (Fig. 375, S.S.I.)

CARDAMOM (*Elettaria cardamomum*).

Stem borer ...	Hill tracts along the Western Ghats.	Larva boring into stem and often killing it.	*Dichocrocis punctiferalis*, G. (Pyralid—moth).	See under turmeric and ginger.	A minor pest.
Capsule borer.	Coorg	Beetle boring and destroying capsules.	Scolytid beetle ...	Collection and destruction of first attacked capsules. No other method known so far.	A minute dark brown beetle (Fig. 203, S.S.I.)

CINNAMON (*Cinnamomum zeylanicum*).

Leaf psyllid ...	South Kanara ...	Larvae and adults causing galls in shoots and leaves and sucking sap.	*Pauropsylla depressa*, C. (Psyllid—bug).	Clip galled leaves and shoots.	Commonly noted.

COFFEE (*Coffea arabica*).

White borer ...	Nilgiris, Coorg, Mysore, South Kanara.	The white grub bores into the stem and kills it often.	*Xylotrechus quadripes*, Ch. (Cerambycid—beetle).	Pruning of dead and dying shoots and scrubbing the bushes to remove loose bark to prevent egglaying.	A black and white-spotted beetle with long feelers. (Fig. 178, S.S.I.) A serious pest of coffee.
Red borer ...	In different parts of the South Indian hill districts.	Red caterpillar bores into the shoot and stem.	*Zeuzera coffeoe*, N. (Zeuzerid—moth).	The branches containing the borer may be lopped off as they are easily located.	Not a common pest of coffee. (Fig. 323, S.S.I.)
Mealy bug ...	Do.	Colonies of these attack the roots of the coffee seedlings.	*Pseudococcus citri*, R. (Coccid—mealy bug).	The soil may be irrigated with water mixed with crude oil emulsion.	(Pl. XX, Fig. 2, Coccid Bulletin.)
Green bug ...	Throughout South Indian hills.	Colonies of this scale insect cover the leaves and suck the juice.	*Lecanium viride*, G. (Coccid—scale).	Cut and burn badly infested shoots and spray with fish-oil soap. Destroy ants' nests in the vicinity.	Sometimes bad on coffee in some plantations, the scale is killed in numbers during the rainy season by a fungus. Cocc. Bull. Pl. XVII (2).
Brown bug ...	Do.	Do.	*Saissetia hemisphaerica*, T. (Coccid—scale). Other scales sometimes noted on coffee are *Pulvinaria psidii*, M., and *Saissetia nigra*, N.	Do.	Fig. 5, Cocc. Bull.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		DYES, DRUGS, SPICES, NARCOTICS, ETC.—*cont.*			
		COFFEE (*Coffea arabica*)—cont.			
Leaf caterpillars.	Along the Western Ghat.	Feeding on leaves and often seedlings.	*Euxoa segetum*, Sch. (Noctuid—moth). Other caterpillars occasionally noted are *Belippa laleana*, M. (Slug—Limacodid), *Olene mendosa*, H. (Hairy caterpillar—Lymantrid) and *Homona coffearia*, N. (Flush-worm—Tortricid—moth).	See under potato, red-gram, castor, and tea.	Euxoa is a cutworm and attacks numerous plants on the hills. (Fig. 237, S.S.I.) For *Olene* and *Homona* see Figs. 264 and 330, S.S.I.
Coffee shoot and berry bug.	Nilgiris and Shevaroys.	Sucks shoots and berries.	*Antestia cruciata*, F. (Pentatomid—bug).	Collect or net the bugs ...	(Fig. 350, S.S.I.) Found on jesmine also.
Cockchafer ...	Coorg, Mysore and Travancore.	The grub attacks the seedlings and adults attack foliage.	*Holotrichia conferta*, S. (Coorg and Mysore). *Serica pruinosa*, B. (Travancore) (Melolonthid—beetles).	Put up light traps for adults and irrigate seedlings with poisoned water.	These are occasionally bad.
Leaf beetles ...	Coorg, Shevaroys, Nilgiris.	Feed on foliage	*Sympiezomias frater*, M. (Curculionid—beetle). *Corynodes sp.* (Chrysomelid—beetle).	Jar the weevils from the plants and destroy them.	Though found in numbers are minor pests only. *Corynodes* is a shining bluish-green beetle.
Coffee shoot borers.	Coorg, Malabar ...	Bore and breed in shoots and twigs of growing and dead stems.	The species noted are—*Xyleborus compactus*, E, *X. fornicatus*, E. and *X. morstatti*, E. (Scolytid—beetles).	Prune badly infested branches and burn them with insects.	*X. fornicatus* is found on castor also. (Fig. 204, S.S.I.)

Coffee leaf hopper.	Nilgiris	Larvae and adults sucking sap from tender parts; sometimes found in numbers.	*Ricania bicolorata*, D. (Fulgorid—bug).	Net the bugs and spray the plants with deterrent insecticide when necessary.	An active black insect found in numbers during summer in the Nilgiri slopes.
Coffee berry beetle.	Western Ghats, Mysore.	Beetle bores into pulp of berries; also found in stored berries.	*Araecerus fasciculatus*, Dg. (Anthribid—beetle), the Scolytid. *Stephanoderes hampeii* has not yet been definitely noted on Indian-grown coffee.	Destroy infested berries and fumigate stored coffee.	Found attacking arecanuts also.
Coffee grasshopper.	Do.	Feeding on foliage; occasionally found in some numbers.	*Aularches miliaris*, D. (Acridiid—grasshopper).	Net the grasshoppers ...	Rarely a pest. (Fig. 418, S.S.I.)
			TEA (*Camellia theifera*).		
Tea mosquito.	All along Western Ghats and Nilgiris.	Sucking up sap from tender parts and leaves and making them fade; often serious.	*Helopeltis antonii*, S. Occasionally another common hill Capsid. *Displinctus humeralis*, W., is also seen.	Netting the bugs and spraying deterrent washes.	(Fig. 374, S.S.I.) often a very bad pest in all the tea districts.
Leaf carterpillars.	In different tea districts of South India.	Caterpillars found feeding on foliage in different ways as open feeders, feeding in folds of leaf, etc.	Chief of the species noted in South India are—*Heterusia virescens*, B., *Buzura suppressaria*, G., *Homona coffearia*, N., *Laspeyresia leucostoma*, M., *Contheyla rotunda*, H., *Dasychira horsfieldi*, S., *Thosea cervina*, M.	Zygaenid—moth. Geometrid ,, Tortricid ,, Eucosmid ,, Limacodid ,, Lymantrid ,, Limacodid ,, } Different methods for different species; hand-picking, pruning, scraping stems containing cocoons, etc.	For Heterusia and Buzura. See Figs. 326 and 281, S.S.I.
Shot-hole borer.	Travancore and Malabar.	Bore holes into twigs and shoots.	*Xyleborus fornicatus*, E., *X. semigranosus* (Malabar) (Scolytid—beetles).	Prune badly infested shoots.	See under coffee.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
			DYES, DRUGS, SPICES, NARCOTICS, ETC.—*cont.*		
			TEA (*Camellia theifera*)—*cont.*		
Stem-borers ...	In the tea districts...	Larvæ bore into stem ...	*Zeuzera coffeae*, N. (Zeuzerid—moth). *Indrabala theeivora*, H. (Small dark brown—moth). *Phassus malabaricus*, M. (Hepialid—moth).	Same as under coffee ...	Only occasionally serious. For *Phassus* see Fig. 344, S.S.I.
Scale insects ...	Do. ...	Cover shoots and leaves in colonies.	Chief species are—*Aspidiotus camelliae*, Sign, *Saissetia hemisphaerica*, T. (Coccid—bugs).	Prune badly infested branches and spray contact insecticide, if necessary.	*Camelliæ* is sometimes bad. Cocc. Bull. Pl. VII (2).
Thrips ...	Nilgiris	Attacking tender parts...	*Dendrothrips bispinosus*, B. (Thripid—thrips).	Of very minor importance.	Noted once on the Nilgiris. Thya. Memr., p. 252.
Tea mites ...	In all tea districts ...	Cover the plants in colonies and juice.	Two species—*Phytopus carinatus* and *Tetranychus biociulatus* (mites).	Dusting with flowers of sulphur effective.	The purple and red mites of tea. (Figs. 440 and 439, S.S.I.) *Not insects.*
			CACAO (*Theobroma cacao*).		
			(In South India it is grown only in Government Gardens, Kallar.)		
Mealy bug ...	Nilgiri slopes ...	Covering shoots and pods.	*Pseudococcus citri*, R. (Coccid—mealy bug).	Prune badly infested branches and spray contact insecticide, if necessary.	(Pl. XX, Fig. 2, Cocc. Bull.)

TOBACCO (*Nicotiana tabacum*).*

Tobacco caterpillar.	Northern Circars, Coimbatore, Tanjore and Madura.	Feeding on the foliage either in the nurseries or planted areas.	*Prodenia—litura*; F. (Noctuid—moth); other species occasionally found are *Chloridea assulta*, G. and *Plusia signata*, F.	The first is the same as the one on castor, agathi, tomato, etc. Egg clusters and leaves containing numerous caterpillars may be collected and destroyed. In bad cases spraying with a stomach poison.	*Prodenia* is often serious and found on various other plants. (Figs. 1 and 2, Tob. Bull.)
Stem-borer ...	Northern Circars, Ceded Districts, Coimbatore and South Arcot.	The small caterpillar bores into the stem and produces galls on the stem.	*Pthorimoea heliopa*, L. (Gelechiad-moth).	Only preventive being a borer; cut out the larvæ in first attacked plants. Destroy attacked seedlings before transplantation from nursery.	Both the caterpillar and moth are small. Attacked plants can be easily made out from the swelling at the stem. (Col. Pl. XLIII, S.S.I. Fig. 4 (*c—g*), Tob. Bull.)
Gram caterpillar.	All over South India.	Caterpillar boring into seed capsules.	*Heliothis obsoleta*, F. (Noctuid—moth).	See under red-gram; cover the flower heads with muslin to prevent attack.	Occasionally serious. (Fig. 5, Tob. Bull.)
Plant-lice ...	In all tobacco tracts.	Colonies of these infest the leaves, suck the juice and affect their vigour.	*Myzus persicæ*, S. (Aphidid—bug).	In bad infestation spray with tobacco decoction which is very effective.	A pest often reported from South Kanara, Guntūr, Tanjore and Coimbatore districts. (Fig. 4 Tob. Bull.)
Capsid ...	Do.	Swarms settle on tender parts and suck sap.	*Gallobelicus crassicornis*, D. (Capsid—bug).	Net the bugs and if necessary, spray tobacco decoction as deterrant.	Fig. 6 (*i*), Tob. Bull.
Grasshoppers.	Do.	Feed on the seedlings in the nursery and on the foliage in the fields.	*Atracto morpha crenulata*, Fb., *Chrotogonus robertsoni*, B. (Acridiid—grasshoppers).	Net and trap them with poison baits.	Fig. 3, Tob. Bull.

* For detailed information on tobacco pests see author's bulletin on tobacco insects in South India. (Agr. Deptt. Bull. No. 26.)

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestions for control, if any.	Remarks.
		DYES, DRUGS, SPICES, NARCOTICS, ETC.—*cont.*			
		TOBACCO (*Nicotiana tabacum*)—*cont.*			
Root-sucking bug.	Coimbatore ...	Young and adults attach themselves to roots and rootlets and suck sap; this causes fading and even death of affected plants.	*Stibaraopus tabulatus, Fb.* (Pentatomid—bug).	Irrigate the plants infested with contact insecticide and water.	Fig. 7, Tob. Bull.
Ground beetles.	Guntūr	Nibbling roots and shoots of seedlings.	*Opatroides frater*, F. and *Seleron latipes*, G. (Tenebrionid—beetles).	Rake up soil and poison irrigation water with contact insecticide.	See under potato.
		GANJA (*Cannabis sativa*).			
Gram caterpillar.	Ganja areas in the Presidency (North Arcot, Guntūr, etc.)	Feeds on the foliage ...	*Heliothis obsoleta*, F. (Noctuid—moth).	See under gram	Worst caterpillar pest of ganja.
Leaf caterpillar.	Do.	Feeding on the leaves ...	Those often found are the following *spp. Amyna octo*, G. *Laphygma exigua Prodenia litura* (Noctuid—moths).	Handpick caterpillars early in the season. Not advisable to spray arsenates on the leaves.	One or other of these at times become serious.
White ant ...	Do.	Workers attacking growing plants.	*Microtermes obesus*, R. (Termitidæ—white-ant).	Irrigate water mixed with insecticide.	Sometimes bad.
Thrips ...	Do.	Swarm on tender shoots and suck sap.	*Heliothrips indica*, B. (Thripid—thrips).	Dust with fine tobacco powder.	See under groundnut and Onion. Thys. Mem. fig. 1.
Ganja mite ...	Do.	Do.	*Tetranychus telarius*, L. (Acari—mite).	No effective remedies known.	This pest is often bad in Upper India also. *Not an insect.*

CINCHONA (*Cinchona ledgeriana*).

Chafer beetles.	Nilgiris	Grubs attack the roots ...	The chief of the species noted are—*Holotrichia repetita*, S., *Rhizotrogus rufus*, A., *Serica nilgiriensis*, S., *Popillia chlorion*, N., (Rutelid and Cetoniad—beetles).	Light traps may be put up to catch adults. Plants may be irrigated with insecticide mixed with water and grubs collected.	Sometimes very bad on the Nilgiris.
Leaf and shoot capsid.	Anamalais	Sucks up juice from young plants.	*Disphinctus humeralis*, W. (Capsid-bug).	Net the bugs	Occasional pest. See under "Tea."
Leaf weevils...	Nilgiris	Feeds on foliage ...	*Sympiezomias decipiens*, M. (Curculionid—beetle).	Jar beetles and dust plants with arsenate.	A minor and often sporadic pest.

PALMS.

COCONUT (*Cocos nucifera*).

Rhinoceros beetle.	All over South India, chiefly along the West Coast.	The beetle burrows into the growing shoot and cuts the same often killing it.	*Oryctes rhinoceros*, L. (Dynastid—beetle).	Preventive measures are the most effective. Prevent insect breeding in manure pits. Cut open and dry dead and rotting trees to check the pest breeding in them. The beetle can also be pulled out by a hooked wire from infested crowns.	The beetle is black and has a horn on the face like the rhinoceros. It is a bad pest of coconuts all over South India. Col. Pl. III, S.S.I.
Red weevil ...	Do.	The grubs burrow into the soft portions and do damage.	*Rhynchophorus ferrugineus*, F. (Curculionid—beetle).	Scars and wounds on the tree crown should be tarred to prevent the weevil laying eggs. If the rhinoceros beetle is checked the weevil will also be automatically checked since the latter often follows the former.	A red cylindrical insect with a long curved pointed snout. All the stages are found in infested trees. Pl. XLV, S.S.I.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestion for control, if any.	Remarks.
			PALMS—*cont.*		
			COCONUT (*Cocos nucifera*)—*cont.*		
Black-headed caterpillar.	West Coast, Northern Circars, and parts of Coromandel coast.	The caterpillar feeds on the leaf, remaining between the folds of the leaf.	*Nephantis serinopa*, M. (Xyloryctid—moth).	Cutting off attacked fronds and burning them. Only preventive method practicable. Encourage parasites	Often a serious pest along the West Coast. Fig. 336, S.S.I.
Slug caterpillars.	Do.	Caterpillars feed on the foliage.	*Parasa lepida*, G. (all over South India), *Contheyla rotunda*, H. (found only in the West Coast till now), *Natada nararia*, M. (once noted bad in Gōdāvari), (Limacodid—moths).	Cutting off infested fronds and destruction of cocoons on the stems.	For *Parasa* see under "Castor" and "Mango."
Skippers ...	All over South India.	The caterpillars cut young leaves and feed inside the folds.	*Gangara thyrsis*, M. (on young coconut trees chiefly), *Suastus gremius*, F. (More on palmyra), (Hesperid—butterflies).	The leaf-folds containing caterpillars can be easily handpicked.	The pest is bad only on young trees. The caterpillars are covered with white powdery wax. Figs. 290, 291, S.S.I.
Scale insects ...	West Coast, Coimbatore, Tinnevelly and Anantapur.	Colonies of these small insects cover the foliage and suck juice.	*Aspidiotus destructor*, S., this is the chief of those found and often destructive; others noted are *Aspidiotus ficus*, A., *Ceroplastes actiniformis*, G., *Vinsonia stellifera*, W., *Lecanium hesperidum* (Coccid—scales).	Cutting off and burning the badly infested fronds is the best and effective remedy.	The first is an oval transparent insect found often in colonies on the foliage ; See Coco. Bull., Pl. VII (1), Pl. XII (2), and Pl. XIV(1).

Mealy bug ...	West Coast and Coimbatore.	Colonies of these small insect cover the foliage and suck juice. Tender shoots suffer much.	*Pseudococcus longispinus*, T. (Coccid—mealy bug).	Cut off badly infested parts and if necessary spray contact insecticide.	Fig. 1, Pl. XXI of Coccid bulletin.
Stem weevil ...	West Coast tracts ...	Numbers found breeding in stem. Status as pest doubtful.	*Calandra stigmaticollis*, G. (Curculionid—weevil).	Collect beetles and destroy.	Very probably the insect comes after some disease; small brownish weevils.

PALMYRA (*Borassus flabellifer*).

(The first four insects under coconut are pests also of palmyra in South India.)

DATE (*Phoenix sylvestris*).

(The rhinoceros beetle and the red weevil are the chief pests of this palm also.)

ARECA (*Areca catechu*).

Scale insects...	West Coast, Mysore, Coimbatore and Nilgiris.	Colonies suck the juice ...	Chief species concerned are—*Chionaspis dilatata*, G. and *Pinnaspis aspidistrae*, S. (Coccid—scales).	Prune badly infested parts and spray contact insecticide.	For the first see Fig. 2, Pl. VI of Coccid bulletin.
Nut beetle ...	West Coast	Bores into nuts	*Aroecerus fasciculatus*, D. (Anthribid—beetle).	Destroy badly infested nuts.	See under coffee.

FLOWER AND ORNAMENTAL GARDEN PLANTS.

ROSE (*Rosa centifolia*).

Leaf caterpillars.	Coimbatore, Madras, Malabar, and Northern Circars.	Feeding on the foliage ...	*Euproctis fraterna*, M. (Lymantrid-moth) *Parasa lepida*, Cr. (Limacodid-moth), *Achoea janata*, L. (Noctuid—moth).	See under castor for all these insects.	The first two caterpillars are hairy, spiny and irritating to the touch. The last noted in Northern Circars.
Grape thrips...	Coimbatore, and Northern Circars.	Swarming on tender parts and sucking sap. The tissue gets blighted.	*Rhipiphorothrips cruentatus*, H. (Thripidae—thrips).	See under grape-vine ...	Often very serious in Coimbatore. Fig. 16, Thys., Mem.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestion for control, if any.	Remarks.
FLOWER AND ORNAMENTAL GARDEN PLANTS)—*cont.*					
ROSE (*Rosa centifolia—cont.*					
Red scale ...	Malabar, and Northern Circars.	Colonies are found on twigs and leaves sucking the juice.	*Aspidiotus aurantii*, M. (Coccid—bug).	Cut and burn badly infested shoots and spray with crude oil emulsion.	Sometimes whole plants are killed by this scale. It is a well-known pest of oranges elsewhere but not noted on oranges as yet in South India. Fig. 1, Pl. IX, Coccid bulletin.
*Chafer beetles.	Nilgiri Hills, and Coimbatore.	Adult beetles feeding on flowers.	*Oxycetonia versicolor*, F., and other Cetoniad—beetles.	Net or handpick the beetles. Light traps may also be put up.	See under "Cholam".
Leaf cutter bees.	Coimbatore, Nilgiris and Malabar.	Bees cutting tender leaves and removing the cut pieces to their hive.	*Megachile anthracina*, S. is the chief *sp.* noted; other *spp.* of *Megachile* have also this habit of cutting leaves of different plants.	Catch the bees or dust arsenate on leaves.	These are not the honey bees but bigger forms of the same family.
JASMINE (*Jasminum sambac*).					
Red scale ...	Northern Circars ...	Covering leaves and sucking sap; often very serious.	*Aspidiotus aurantii*, M. (Coccid—scale).	Prune badly infested parts and spray contact insecticide.	See under "Rose". Fig. 1, Pl. IX, Cocc. Bull.
Jasmine bug...	Ceded Districts ...	Sucking up juice from buds and flowers; sometimes serious.	*Antestia cruciata*, F. (Pentatomid—bug).	Bugs may be collected or killed by fumigation.	See under "Coffee". A tingid also occurs sometimes
Mealy bug ...	Coimbatore and Salem.	Colonies appear on tender parts and suck sap.	*Phenacoccus ornatus*, Gr. (Coccid—bug).	Clip badly infested parts and spray contact insecticide.	A beautiful delicately built white insect found sometimes in numbers on the foliage.

Thrips ...	Coimbatore and Mysore.	Colonies appear on tender parts and suck sap; flowers are often badly damaged.	*Isoneurothrips orientalis*, B. (Thripid—thrips).	May be treated in the same way as for jasmine bug.	Minute blackish active insects found inside flowers. Thys. Mem., p. 261.
Mealy wing ...	Do.	Do.	*Dialeurodes vulgaris* ?, K. (Aleyrodid—bug).	Clipping badly infested leaves and spraying with dilute crude oil emulsion.	Infested leaves appear pale yellowish and show numerous oval pupae on the under surface; these are the nymphal cases of the insect.
Leaf caterpillar.	Coimbatore and Tanjore.	Feeding on foliage ...	*Glyphodes unionalis*, F. (Pyralid—moth).	Handpick caterpillars or dust with arsenates.	Moth with transparent white wings.
		CHRYSANTHEMUM.			
Caterpillar ...	Madura	Feeds on foliage and flowers and causes severe damage sometimes.	*Lamprosema indicata*, F. (Pyralid—moth).	Spray or dust with arsenate.	Figs. 309 and 310, S.S.I Insect is found also on pulses in different parts of India.
		OLEANDER (*Nerium oleander*).			
The oleander sphinx.	All over South India.	The stout big caterpillar defoliates the plants.	*Deilephila nerii*, L. (Sphingid—moth).	Handpicking of eggs and caterpillars very easy and effective.	The caterpillar is a very stout and long one with a spine over the tail end. Figs. 273 and 274, S.S.I.
The nymphalid butterfly.	Do.	Feeding on leaves ...	*Euploea core*, C. (Nymphalid—butterfly).	The caterpillars and pupae can be easily handpicked and the butterflies can be netted.	A common butterfly, with dark wings with white spots. The pupa is a shining gold coloured chrysalid hanging from the leaf.
		LILIES.			
Lily caterpillar.	Coimbatore, Madras and Malabar.	The pretty caterpillar bores into the fleshy leaves and leaf stalk in numbers.	*Polytela gloriosa* (Noctuid—moth).	The leaves containing these caterpillars feeding gregariously could be clipped and destroyed with the larvae; the pupae under the soil may also be dug up.	The caterpillar is a cylindrical red and white spotted insect. Fig. 238, S.S I.; attacks all liliaceous plants.

* Grubs of chafer beetles such as *Anomala Adoretus*, *Holotrichia*, etc., damage the roots of many garden plants.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestion for control, if any.	Remarks.
		LILIES—*cont.*			
		MAKUTUM (*Mimusops elengi*).			
Leaf thrips ...	Coimbatore, Tanjore and Trichinopoly.	Larvae and adults attack leaves and cause galls.	*Arrhenothrips ramakrishnae*, H. (Phloeothripid—thrips).	Clip badly galled parts and spray tobacco decoction.	A dark ant-like insect found inside the leaf galls and folds. Fig. 25, Thys. Mem.
		TULSI (*Ocimum sanctum*).			
Lace-wing bug.	All over South India.	Small dark insects infest leaves in numbers and suck the juice.	*Monanthia globulifera*, W. (Tingidid—bug).	Spray tobacco decoction ...	Fig. 371, S.S.I.; Minute creatures found in colonies.
Scale insect ...	Do.	Colonies of these waxy insects cluster on the shoots and suck the juice.	*Ceroplastodes cajanii*, M. (Coccid—scale).	Same as above for lace-wing bug but with a stronger solution of emulsion.	See under "Red-gram." Cocc. Bull., Pl. XV (2).
		GARDEN CROTONS.			
Scales ...	All over South India.	Cover shoots and stems and suck sap.	Chief species found are *Saissetia nigra*, N., *Lecanium depressum*, C., *Lepidosaphes* sp.? (Coccid—Scales).	Prune badly infested parts and spray with strong contact insecticide.	See under "Cotton."
Mealy bugs ...	Do.	Do.	*Pseudococcus virgatus*, C., *Icerya aegyptiaca*, D., *Monophlebus phyllanthi*, G. (Coccid—mealy bugs).	Do.	Sometimes one or other of these completely cover the shoots and tender leaves allowing swarms of ants to visit them.

Thrips ...	Bangalore and Coimbatore.	Do.	*Heliothrips haemorrhoidalis*, B., *and Ayyaria choetophora*, K.	Do.	The first a well-known insect affecting many hot-house plants in different parts of the world.
Stem ringing beetle.	Coimbatore	The beetle cuts the stem; sometimes kills the plants.	*Sthenias grisator* F. (Cerambycid—beetle).	See under "Mulberry" ...	Sometimes serious.

HOLLY-HOCK AND SHOE-FLOWER (*Hibiscus rosasinensis*).

(Many of the insects affecting cotton are found on different kinds of shoe—flower and holly-hock such as the species of spotted boll-worms, leaf-roller, bugs, caterpillars on leaf and scales).

SUN-FLOWER (*Helianthus annuus*).

Gram caterpillar.	Coimbatore, and Mysore.	Caterpillar feeds on leaves and seeds.	*Heliothis obsoleta*, F. (Noctuid—moth).	See under "gram" ...	Occasionally found in numbers.

PARIJATH (*Nyctanthes arbortristis*).

Leaf caterpillar.	Madras and Coimbatore.	Big caterpillar feeding on leaves.	*Metanastria hyrtaca*, C. (Lasiocampid—moth).	Pick off the caterpillars.	Of minor importance; also found on country almond.

TABERNIMONTANA.

Leaf caterpillar.	Cochin, and Malabar.	Feeding on leaves ...	*Glyphodes glauculalis*, G. (Pyralid—moth).	Handpick caterpillars or dust arsenate.	A light blue moth with a yellowish streak along front margin of fore-wing.

GRASSES, FODDER AND GREEN MANURE PLANTS.

LUCERNE (*Medicago sativa*).

Caterpillar ...	Coimbatore and Godavari.	Feeding on the foliage and tender shoots.	*Laphygma exigua*, H., is the chief species (Noctuid—moth).	Netting the caterpillars. It is not safe to use arsenates which will of course kill the pest.	See under "Onions," etc.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestion for control, if any.	Remarks.
GRASSES, FODDER AND GREEN MANURE PLANTS—*cont.*					
LUCERNE (*Medicago sativa*)—*cont.*					
Leaf beetles ...	Coimbatore and Gōdāvari.	Biting small holes on the leaves; often found in numbers and doing substantial damage.	Chief species noted is the pumpkin beetle *Aulacophora abdominalis*, F. Other small flea beetles are also found occasionally.	Collect beetles with hand-net.	See under "Cucurbitaceæ."
GUINEA GRASS (*Panicum jumentorum*) AND OTHER GRASSES.					
Hairy caterpillar.	Coimbatore and South Arcot.	Feeding on the foliage ...	*Psalis securis*, H. (Lymantrid—moth).	See under "Paddy" ...	Rarely serious.
Swarming caterpillars.	Coimbatore, Hosur and Chingleput.	Feeding on the grass plots in fodder areas; sometimes cause serious damage.	More important of the species concerned are—*Spodoptera mauritia*, B., *Cirphis albistigma*, M., *C. loreyi* and *Pelamia frugalis* (Noctuid—moths), *Psara phacopteralis*, G. (Pyralid—moth).	Netting of caterpillars; deep ploughing; baiting with traps, etc. No satisfactory method known yet.	Some of these are pests of paddy.
Rice bug ...	Malabar, Ganjam and Kistna.	Feeding on the flower heads of grasses.	*Leptocorisa acuta*, Th. Probably another spp. of this genus also.	See under "Paddy" ...	Not serious generally.
BAMBOO (*Bambusa, Dendrocalanus, Ochlandra, etc.*).					
Plant lice ...	Coimbatore	Colonies swarm on leaves and suck sap.	*Oregma bambusae*, B. (Apidid—bug).	Clip badly infested parts and spray contact poison.	Fig. 392, S.S.I.

Scales	Coimbatore and Malabar.	Do.	*Chionaspis elongata*, Gr., *Asterlecanium longum*, Gr. and other spp. (Coccid—scales).	Do.	Sometimes these scales very badly cover the foliage and blighten them.
Mealy bug ...	Malabar	Cover shoots in white masses.	*Pseudococcus detorquens*, Gr. (MS.).	Do.	Noted once in Walayar.
Stem bug ...	Coimbatore	Adults and nymphs settle in numbers and suck sap.	*Purohita nigripes*, D. (Fulgorid—bug).	Collect adults and egg-masses.	Eggs and nymphs are seen in white woolly masses attached to the bamboo stem inside the sheathing.
Stem-borer ...	Bellary	Larva bores into bamboo stem.	*Stromatium barbatum*, F. (Cerambycid—beetle).	Destroy first attacked stems.	Fig. 392, S.S.I.
Shoot borer chalcid.	Malabar Forests ...	Numerous grubs found inside drying shoots.	*Eurytoma chrysothrix*, W. (Chalcidid—Wasp).	Cut off badly infested branches.	In habits this insect appears to be similar to the daincha pod wasp *Bruchophagus*.

AGATHI AND DAINCHA (*Sesbania grandiflora*, *S. aculeata and S. ægyptiaca*).

Stem-borer ...	All over South India.	The stout whitish caterpillar bores into the stem and often kills the plant.	*Azygophleps scalaris*, Fb. (Zeuzeridæ—moth).	Preventive only being a borer. Cut out first attacked stems and destroy larvæ and pupæ. Egg clusters may also be collected and destroyed.	A fairly serious pest, sometimes in betelvine gardens where the caterpillar is called "*Chandana puchi*" in Tamil, Fig. 324, S.S.I.
Tobacco caterpillar.	Coimbatore, South Arcot and Madura.	The caterpillar feeds on the leaves.	*Prodenia litura*, F. (Noctuid—moth).	Same as on castor. In betelvine gardens the infested areas are sometimes flooded in Agathi nurseries.	See under castor, tobacco, tomato, etc. Sometimes bad in Agathi nurseries in betelvine gardens.
Agathi weevil.	Do. Arcot and Madura.	The weevil and the grub feed and breed on the tender shoots.	*Alcides bubo*, F. *A. fabricii*, F., is also found occasionally. (Curculionid—beetles).	Same as on cluster bean and indigo; clipping attacked top shoots in young plants.	Not bad on grown-up plants.
Shoot bugs ...	Do.	Attach themselves in numbers to tender parts and suck sap.	*Coptosoma cribraria*, F. *Brachyplatis vahlii*, F. (Pentatomid—bugs).	Net the bugs; this is quite easy.	See under "Lab-lab."

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestion for control, if any.	Remarks.
GRASSES, FODDER AND GREEN MANURE PLANTS—*cont.*					
AGATHI AND DAINCHA (*Sesbania grandiflora, S. aculeata and S. ægyptiaca*)—cont.					
Moth caterpillars.	All over South India.	Feed on the foliage and sometimes cause severe damage especially on a young crop.	*Laphygma exigua*, Hb. *Pericyma glaucinans*, G. (Noctuid—moths).	Can be sprayed with arsenates when not used for fodder.	For *Pericyma* see Fig. 255, S.S.I.
Butterfly caterpillars.	Do.	Do.	*Terias hecabe*, L. *Catopsilia pyranthe*, L. (Pierid—butterflies).	Collect the butterflies with net and spray if necessary if crop is not for fodder.	Figs. 287 and 286, S.S.I.
Seed wasp ...	Coimbatore	Grub develops inside seed capsule; sometimes does serious damage.	*Bruchophagus mellipes*, G. (Chalcidid—wasp).	First attacked seeds to be destroyed.	A small shining black wasp, one of the very few plant pests among the hymenoptera in South India.
(KOLINGI) WILD INDIGO (*Tephrosia purpurea*).					
Seed pod caterpillar.	Tanjore and Tinnevelly.	Caterpillar bores into seed pods and buds and causes swollen galls.	*Dactylethra candida*, St., (Gelechiad—moth).	Destroy first appearing galls and spray arsenates if necessary.	Seed formation is prevented by the caterpillar.
MURUKKAM (DADAP) (*Erythrina indica*).					
Shoot borer ...	Malabar, South Kanara, Bellary, Madras, and South Arcot.	Caterpillar bores into shoots and tender capsules.	*Terastia meticulosalis*, G. (Pyralid—moth).	Destroy first attacked shoots and pods.	Fig. 315, S.S.I.

Leaf caterpillar.	South Arcot and Coimbatore.	Feeds on leaves	*Agathodes ostentalis*, H. (Pyralid—moth).	Collect leaves with the larvae.	A minor pest; beautifully coloured moth.
Plant bug ...	Malabar and South Kanara.	The dark bug sometimes covers tender parts in thousands and sucks sap.	*Cyclopelta siccifolia*, W. (Pentatomid—bug).	Net the bugs; this is very easy.	Fig. 357, S.S.I.
Leaf beetle ...	South Kanara and Nilgiris.	Small spiny beetles feeding on foliage; the larva is also found in the same situation.	*Platypria echidna*, G. (Hispid—beetle).	The spiny beetles can be easily netted.	Minor pest.
Pod bug ...	Do.	The stout dark bug sucks up juice from the pods and tender shoots.	*Anoplocnemis phasiana*, F. (Coreid—bug).	Collect the bugs by hand or net.	See under Cowpea.
Stem girdler...	Coorg	The beetle rings the branches of the plant.	*Sthenias grisator*, F. (Cerambycid—beetle).	See under "Mulberry" ...	Sometimes bad.

CALOTROPIS (*Calotropis gigantea*).

Weevil ...	All over South India.	Larva bores into shoots and rind.	*Paramecops farinosa*, W. (Curculionid—weevil).	Destroy first attacked parts.	Of minor importance. Fig. 190, S.S.I.
Stem borer ...	Do.	Larva bores into the stem.	*Monohammus nivosus*, W. (Cerambycid—beetle).	Do.	Of minor importance.
Leaf caterpillars.	Do.	Feeding on foliage ...	*Danias chrysippus*, L. (Nymphalid—butterfly).	The butterflies can be netted and caterpillars handpicked.	Rarely found as a pest though common.
Fruit-fly ...	Do.	Maggots bore into seed-capsules.	*Dacus longistylus*, W. (Trypaenid—fruit-fly).	Destroy first infested capsules.	Almost exclusively found on this plant.
Grasshopper...	Do.	Feeding on foliage ...	*Poecilocerus pictus*, F. (Acridiid—grasshopper).	Collect the grasshoppers; it is very easy.	A pretty grasshopper. Fig. 419. S.S.I. Very commonly found.
Plant lice ...	Do.	Fringe backside of leaves in colonies and suck sap.	*Aphis nerii*, B. (Aphid—bug).	Destroy badly infested leaves.	Minute yellowish insects.
Leaf hopper bug.	Do.	Suck juice from tender parts.	*Eurybrachis tomentosa*, F. (Fulgorid—bug).	Bugs can be easily collected.	An active green and red bug.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestion for control, if any.	Remarks.
SOME USEFUL TREES OF THE PLAINS.					
NIM (*Azadarichta indica*).					
Nim scale ...	Coimbatore, Bellary and Kistna.	Colonies cover the whole tree and cause severe blight.	*Pulvinaria maxima*, Gr. Other scales noted are *Lepidosaphes meliae*, Gr., and *Parlatoria camelliae*, C. (Coccid—scales).	Prune badly infested branches and spray contact insecticide.	This *Pulvinaria* is a specific pest of this tree; also found to a small extent on Cotton and Jatropa. Pl. II and XIII, Coccid bulletin.
Shoot bug ...	Coimbatore	Suck the sap from shoots which dry up often.	*Helopeltis antonii*, S. (Capsid—bug).	Collect the bugs with net if possible.	The frequent drying up of nim shoots is believed to be due to the damage by this bug. This has to be definitely confirmed in the writer's opinion. See under "Tea."
BABUL (*Acacia arabica*).					
Babul scale ...	Coimbatore	Colonies cover tender shoots and stem and suck sap.	*Anomalococcus indicus*, Gr. (Coccid—scales.)	Prune badly infested branches; often checked effectively by a predator moth (*Eublemma*).	Very common in and around Coimbatore and visited by the common black ant. Pl. XIX, Coccid bulletin.
Hairy caterpillar.	Coimbatore and Ceded Districts.	Feeding on the foliage and bark.	The chief species found are—*Taragama siva*, Lef. (Lasiocampid—moth), *Euproctis lunata*, W. (Lymantrid—moth).	Prune badly affected branches containing numerous caterpillars and spray arsenate if necessary.	*Taragama* has a stout elongated caterpillar with the colour of the bark and fully clothed with irritating hairs. *Euproctis* appears as a very serious pest in certain years and completely defoliates babul trees in many places.
		The bag worm *Clania crameri*, W. also is sometimes found.			

PUNGAM (*Pongamia glabra*).

Plant bugs ...	Mysore, Malabar and Coimbatore.	Swarms of the bug settle on tender shoots and suck sap.	*Coptosoma cribraria and Cyclopelta siccifolia.* (Pentatomid—bugs).	Same remedies as when the insect is found on lab-lab.	See under "Lab-lab" and "Eythrina" above. Sometimes whole trees are covered by millions of this bug.
Fruit gallfly ...	Coimbatore, Mysore and Ceded Districts.	The fruit pods are bored and turned into round galls.	*Aspondylia pongamiae*, F. (Cecidomiyiad—fly).	Collecting and destroying the early galls is the only practicable remedy that can be employed.	.....
Leaf caterpillars.	Malabar and Coimbatore.	Feeding on the leaf exposed in folds or mining into leaf tissue.	*Parata alexis*, F. (Hesperid—butterfly). A leaf miner is also found.	The leaf folds containing caterpillars could be easily collected with the caterpillars in them.	Not common pests. The leaf miner is often bad in Malabar.
Pod caterpillar.	Madras	Boring into pods ...	*Lamoria* sp. (Pyralid—moth.)	First attached fruit pods may be destroyed.	Found once only in Madras.

PORTIA (*Thespesia populnea*).

Black scale ...	All over South India.	Cover the tender shoots and leaves and suck juice.	*Saissetia nigra*, N. (Coccid-scale.)	Same remedy as for the black scale on garden plants.	Avenue trees very often suffer badly from the "black scale."

TEAK (*Tectona grandis*).

Leaf roller ...	All over South India, chiefly West Coast.	Feeding on leaves inside rolls.	*Hybloea puera*, C. (Noctuid—moth).	Control sometimes difficult in bad cases. Caterpillars may be handpicked and the foliage sprayed with lead arsenate.	Fig. 258, S.S.I. The insect is sometimes found on *Millingtonia* and *Bignonia* plants also.
Teak defoliator.	All over South India, chiefly West Coast.	Defoliating the plants ...	*Pyrausta n achaeralis*, W. (Pyralid—moth).	Control sometimes difficult in bad attacks. Caterpillars may be handpicked and the foliage sprayed with lead arsenate.	Fig. 319, S.S.I. A yellowish brown moth.
Teak gall ...	Tinnevelly	Producing ball-like galls on the branches.	Unidentified *cynipid*? (wasp).	Collect and destroy early forming galls.	So far found only in Tinnevelly forests.
Teak borer ...	Malabar	Grub boring into the stems.	*Psiloptera fastuosa*, F. (Buprestid—beetle).	Infested branches may be cut and the beetles may be caught easily.	Shining green and blue jewel beetle. Fig. 140, S.S.I.
Mealy bug ...	Do.	Covering shoots	*Phenacoccus hirsutus*, G.	Clip badly infested shoots.	Coco. Bull. Pl. XXV., 2.

I.—Insects affecting important cultivated plants in South India—*cont.*

Insect.	Distribution (in pest form in case of important insects).	Nature of injury done to plant.	Scientific name and classification.	Suggestion for control, if any.	Remarks.
		SOME USEFUL TREES OF THE PLAINS—*cont.*			
		CASUARINA (*Casuarina equisetifolia*).			
Bark caterpillar.	Ganjām, Gōdāvari and Kistna.	Caterpillar girdling bark and often causing severe damage.	*Arbela tetraonis*, M. (Arbelid—moth).	See under "Citrus" ...	This insect attacks many trees.
Stem borers ...	All along Coromandel coast.	Grubs bore into the stem and often kill the young plants.	*Caelosterna scabrator*, F., also *C. spinator*, F., and *Heresium simplex*, G. (Cerambycid—beetles).	Sometimes the first is a bad pest and difficult to deal with. Same remedies as for mango and citrus stem borer beetles.	Reported now and then from Coromandel tracts. Fig. 181, S.S.I.
Ground cricket.	Nellore	Damaging seedlings ...	*Brachytrypes portentosus*, L. (Gryllid—cricket).	Collect the cricket; hoe the soil well to kill these underground pests and if necessary irrigate with poisoned water.	Fig. 430, S.S.I.
		RUBBER.			
Stem borer ...	Anamalais and Western Ghats.	Grub bores into stem ...	*Batocera rubus*, L. (Cerambycid—beetle).	Reported once attacking rubber stump in the Western Ghats. Probably a minor pest.	See under "Mango".
Bark beetles...	Western Ghats ...	The small beetles and grubs bore into bark and interfere with latax flow.	*Xyleborus biporus*, S., and allied species (Scolytid—beetles).	Prune badly infested branches and scrape loose bark.	Minute dark brown beetles. Status doubtful.

RAIN TREE (*Pithecolobium saman*).

Mealy bug ...	Coimbatore	Cover the shoots with mealy masses.	*Phenacoccus iceryoides*, G. (Coccid—mealy bug).	Prune badly infested branches and spray contact insecticide.	Pl. XXV, Fig. 1, Coccid bulletin.
Scales... ...	Do.	Cover shoots and stem and suck juice.	*Aspidiotus spp.* and *Aspidoproctus xyliae*, Gr. (Coccid—scale insects).	Do.	Pl. XXX, Coccid bulletin.

BANYAN TREE.

(See under Fig. Most of the pests are same for all Ficus *spp.*)

ASOKA, POINCIANA, ETC. (*Avenue trees*).

Stem borer ...	Coimbatore, Chingleput, etc.	Boring into the stem or between stem and bark in galleries of wood dust.	*Arbela tetraonis*, M. (Arbelid—moth).	The tree bark to be thoroughly scraped and the same treatment to be adopted as when the insect is found on fruit trees.	See under "Citrus" above, sometimes very bad on avenue trees of different kinds.

PALAS (*Butea frondosa*).

The leaf miner beetle.	Mysore, Malabar and Coimbatore.	The grub mines into leaf and causes blister spots on leaves; occasionally serious.	*Trachys bicolor*, K. (Buprestid—beetle).	Cut and burn badly infested leaves.	A small bluish black beetle.
Leaf bug ...	Coimbatore	Hundreds swarm on tender leaves, suck juice, and turn them pale.	*Coptosoma ostensum*, Dt. (Pentatomid—bug).	Clip badly infested leaves.	A lady-bird beetle is found as predator on this.

* II.—PESTS ARRANGED ACCORDING TO THE NATURAL ORDERS WITH THEIR IMPORTANT FOOD PLANTS.

Order—ORTHOPTERA.

	Chief host plants.
Family—*Acridiidae*—	
Hieroglyphus banian, Fb.	Paddy.
Hieroglyphus orizivorus, U.	Do.
Colemania sphenarioides, B.	Cholam, tenai, cumbu.
Atractomorpha crenulata, Fb. ...	Tobacco.
Oxya velox, F.	Paddy.
Chrotogonus saussurei, B.	Cholam, cotton.
Acrotylus humbertiana, S.	Paddy nurseries.
Heteropternis respondens, W. ...	Paddy nurseries.
Locusta danica, L.	Paddy nurseries.
Pyrgomorpha conica, O.	Paddy nurseries.
Aelopus affinis, B.	Paddy nurseries.
Orthacris simulans, B.	Ragi.
Cyrtacanthacris ranacea, S.	Cotton.
Orthacris elegans, B.	Maize.
Oedaleus sp.	Ragi.
Catantops annexus, B.	Cotton.
Aelopus tamulus, F.	Do.
Poecilocerus pictus, F.	Calotropis.
Aularches miliaris, L.	Coffee.
Chrotogonus robertsoni, B.	Tobacco.
Family—*Gryllidae*—	
Brachytrypes portentosus, L.	Casuarina seedlings.

Order—NEUROPTERA.

Family—*Termitidae*—	
Microtermes obesi, Hol.	Wheat.
Odontotermes obesus, Rau	Sugarcane.

Order—HYMENOPTERA.

Family—*Tenthredinidae*—	
Athalia proxima, K.	Cruciferous plants.
Family—*Chalcididae*—	
Bruchophagus mellipes, G.	Sesbania *spp.*
Eurytoma chrysothrix, W.	Bamboo shoots.
Family—*Apidae*—	
Megachile anthracina, S.	Rose and other garden shrubs.
Family—*Formicidae*—	
Dorylus orientalis, W.	Sugarcane.
Selenopsis geminata, F.	Brinjal.
Oecophylla smaragdina, F.	Mango and other trees.

* Non-insect pests noted in Section I are not included in this list.

Order—COLEOPTERA.

	Chief host plants.
Family—*Melolonthidae*—	
Serica nilgiriensis, S.	Cinchona
Serica pruinosa, S.	Coffee.
Holotrichia conferta, S.	Do.
Holotrichia repetita, S.	Cinchona.
Rhizotrogus rufus, A.	Do.
Family—*Rutelidae*—	
Popillia chlorion, N.	Cinchona.
Adoretus bengalensis, B.	Grape-vine.
Adoretus lasiopygus, B.	Do.
Anomala varians, O.	Garden plants.
Family—*Cetoniadae*—	
Anatona stillata, N.	Cholam.
Oxycetonia versicolor, F.	Do.
Protoetia aurichalcea, F.	Do.
Chiloloba acuta, W.	Cholam and cumbu.
Family—*Dynastidae*—	
Oryctes rhinoceros, L.	Palms.
Phyllognathus dionysius, F.	Paddy.
Family—*Erotylidae*—	
Anadastus parvulus, W.	Tenai.
Family—*Coccinellidae*—	
Epilachna 12-punctata, M.	Brinjal, cucurbitaceæ, Potato.
Epilachna 28-punctata, F.	Do.
Family—*Tenebrionidae*—	
Gonocephalum hoffmanseggi, S. and Opatrum *sp.* ...	Grape-vine, potato.
Gonocephalum, depressum, F. ...	Do.
Opatroides frater, F.	Tobacco.
Seleron latipes, G.	Do.
Family—*Meloidae*—	
Mylabris pustulata, Th.	Flowers of various plants.
Mylabris balteata, B.	Groundnut, grasses, etc.
Gnathospastoides rouxi, C.	Earheads of paddy and other cereals.
Lytta ruficollis, O.	Do. do.
Lytta (Cylindrothorax) tenuicollis, P.	Do. do.
Epicauta *sp.*	Paddy ears.
Cantharis setacea	Cowpea.
Family—*Buprestidae*—	
Sphenoptera gossypii, K.	Cotton.
Sphenoptera perotteti, G.	Groundnut.
Psiloptera fastuosa, F.	Teak.
Belinota prasina, Th.	Mango.
Trachys bicolor, K.	Butea.

Order—COLEOPTERA—*cont.*

	Chief host plants.
Family—*Elateridae*—	
Drasterius *sp.*	Potato.
Family—*Cerambycidae*—	
Batocera rubus, L.	Mango, rubber, fig, etc.
Chloridolum alcmene, T.	Citrus varieties.
Chelidonium cinctum, G.	Do.
Xylotrechus quadripes, Ch.	Coffee.
Apomecyna pertigera, Th.	Cucurbitaceae.
A. perotteti, F.	Do.
Sthenias grisator, F.	Garden plants, mulberry, etc.
Stromatium barbatum, F.	Bamboo.
Coelosterna scabrator, F.	Casuarina.
Coelosterna spinator, F.	Do.
Heresium simplex	Do.
Olenecamptus bilobus, F.	Ficus *spp.*
Monohammus nivosus, W.	Calotropis.
Oberea *sp.*	Cow-pea.
Coptops asditicator, F.	Moringa.
Family—*Chrysomelidae*—	
Sagra nigrita, Ol.	Dolichos lab-lab.
Scelodonta strigicollis, Mots	Grape-vine.
Oides affinis, Ja.	Paddy.
Aulacophora stevensi, B.	Cucurbitaceae, Lucerne.
Aulacophora abdominalis, F.	Cucurbitaceae, Lucerne.
Aulacophora atripennis, F.	Cucurbitaceae, Lucerne.
Galerucida bicolor, H....	Elephant-foot yam.
Nisotra madurensis, J.	Gogu.
Monolepta signata, O....	Cotton, Colocasia.
Chalaenosoma metallicum, J.	Potato.
Clitea indica, J.	Bael.
Chaetocnema *sp.*	Ragi.
Lema downsei, B.	Do.
Chaetocnema pusaensis, M.	Millets.
Longitarsus nigripennis, M.	Pepper.
Longitarsus belgaumensis, F.	Sunnhemp.
Hermacophaga ruficollis, L.	Castor.
Phyllotreta downsei, B.	Cruciferae.
Haltica cyanea, J.	Paddy, Ammania.
Aspidomorpha miliaris, F.	Sweet potato.
Metriona circumdata, H.	Do.
Leptispa pygmoea, B.	Paddy.
Oncocephala tuberculata, Ol.	Sweet potato.
Platypria andrewsi, W.	Zizyphus jujuba.
Platypria echidna, G.	Erythrina.
Platypria hystrix, F.	Sesbania, Erythrina.
Hispa arimigera, O.	Paddy.

Order—COLEOPTERA—*cont.*

	Chief host plants.
Family—*Chrysomelidae*—cont.	
Phidodonta modesta, W.	Sugarcane.
Corynodes *sp.*	Coffee.
Family—*Bruchidae*—	
Bruchus theobromae, L.	Red-gram.
Family—*Anthribidae*—	
Araecerus fasciculatus, de. G.	Areca, coffee.
Family—*Curculionidae*—	
Blosyrus inaequalis, B....	Cluster beans.
Sympiezomias frater, M.	Coffee.
Sympiezomias decipiens, M.	Orange, cinchona.
Dereodus mastos, H.	Gogu.
Episomus lacerta, F.	Pulses.
Myllocerus discolor, F.	Cholam.
Myllocerus transmarinus, H.	Tenai.
Myllocerus dentifer, F.	Paddy.
Myllocerus viridanus	Groundnut, bhendai.
Myllocerus subfasciatus, G.	Brinjal.
Atactogaster finitimus, F.	Cotton.
Lixus brachyrrhinus, B.	Amaranthus.
Paramecops farinosus, W.	Calotropis.
Apoderus tranque baricus, F. ...	Mango, terminalia.
Cylas formicarius, F.	Sweet potato.
Eugnamptus marginatus, P.	Mango.
Apion amplum, F.	Green-gram, cashew.
Alcides pictus, B.	Lab-lab.
Alcides bubo, Fb.	Agathi, indigo.
Alcides collaris, P.	On pulses.
Alcides affaber, F.	Gogu.
Alcides fabricii, F.	Pulses and agathi.
Pachytychius mungonis, M.	Green-gram.
Ceuthorhynchus asperulus, F.... ...	Red-gram.
Rhynchaenus mangiferae, M.	Mango.
Cryptorrhynchus mangiferae, F. ...	Do.
Pempheres affinis, F.	Cotton.
Baris *sp.*	Snake-gourd.
Acythopius citrulli, M.	Melon.
Rhynchophorus ferrugineus, F. ...	Palms.
Amorphoides arcuata, M.	Cotton.
Cosmopolites sordidus, G.	Plantain.
Calandra stigmaticollis, G.	Coconut.
Ochyromera artocarpi, M.	Jak.
Athesapeuta oryzae, M.	Paddy.
Echinocnemus oryzae, M.	Do.
Family—*Scolytidae*—	
Xyleborus compactus, E.	Coffee.
Xyleborus fornicatus, E.	Castor, coffee and tea.
Xyleborus morstatti, E.	Coffee.

ORDER—COLEOPTERA—*cont.*

	Chief host plants.
Family—*Scolytidae*—cont.	
Hypothenemus plumeriae, N.	Morinda.
Xyleborus biporus, S.	Rubber.
Xyleborus semigranosus	Tea.

ORDER—LEPIDOPTERA.

Family—*Arctiadae*—	
Amsacta albistriga, W.	Groundnut, cumbu, cholam, etc.
Pericallia ricini, F.	Castor, plantain, etc.
Utetheisa pulchella, L.	Sunnhemp.
Estigmene lactinea, C....	Cumbu, ragi, etc.
Diacrisia obliqua, W.	Castor, sweet potato, groundnut.
Family—*Noctuidae*—	
Spodoptera mauritia, B.	Paddy, grasses.
Heliothis obsoleta, F.	Pulses, ganja, tobacco.
Heliothis peltigera, S....	Safflower.
Heliothis assulta, C.	Tobacco.
Agrotis C-nigrum, L.	Cruciferae.
Euxoa segetum, S.	Potatoes and other garden crops on the hills.
Rabilia frontalis, W.	Cotton.
Adisura atkinsoni, M.	Lab-lab and other legumes.
Sesamia inferens, W.	Ragi, wheat, cane, etc.
Cirphis albistigma, M....	Paddy, grasses.
Cirphis unipuncta, H.	Cholam.
Cirphis loreyi, D.	Cholam, paddy.
Cirphis micacea, H.	Paddy.
Borolia venalba, M.	Do.
Prodenia litura, F.	Tobacco, plantain, castor, etc.
Laphygma exigua, Hb.	Maize, lucerne, onions, chillies, etc.
Polytela gloriosae, F.	Garden lilies.
Perigoea capensis, G.	Safflower.
Amyna octo, G.	Sunnhemp, pulses, ganja.
Eublemma silicula, S.	Cholam.
Eublemma olivacea, W.	Brinjal.
Bombotelia jocosatrix, G.	Mango.
Orthaga exvinacea, M....	Do.
Chlumetia transversa, W.	Do.
Plotheia nephelotis, W.	Brinjal.
Plotheia celtis	Ficus *spp.*
Earias fabia, S.	Cotton and other malvaceae.

ORDER—LEPIDOPTERA—*cont.*

	Chief host plants.
Family—*Noctuidae*—cont.	
Earias insulana. B.	Do.
Tarache nitidula, F.	Cotton and calotropis.
Carea subtilis, W.	Eugenia.
Acontia graellsi, F.	Cotton and Hibiscus esculentus.
Cosmophila indica, G....	Do.
Catephia inquieta, W.	Sweet potato.
Achoea janata, L.	Castor.
Grammodes stolida, F.	Linseed.
Azazia rubricans, B.	Pulses.
Pelamia frugalis, F.	Paddy and grasses.
Pericyma glaucinans, G.	Sesbania.
Plusia chalcytes, F.	Groundnut.
Plusia signata, F.	Do.
Plusia peponis, F.	Snake-gourd.
Plusia orichalcea, F.	Indigo.
Ophideres fullonica, L. and O. materna, L	Citrus plants.
Simplicia robustalis, G.	Ragi and thatching stacks.
Hybloea puera, Cr.	Teak, millingtonia and bignonia.
Family—*Syntomidae*—	
Euchromia polymena	Sweet potato.
Family—*Lymantridae*—	
Dasychira horsefieldi, S.	Tea.
Euproctis fraterna, M.	Castor, cotton, red-grams pomegranate and rose.
Euproctis lunata, W.	Babul trees.
Euproctis scintillans, W.	Gogu, mango, etc.
Psalis securis, H.	Paddy and grasses.
Thiacidas postica, W.	Zizyphus.
Orgyia postica, W.	Castor.
Perina nuda, Fb.	Ficus.
Olene mendosa, H.	Castor.
Family—*Hypsidae*—	
Hypsa ficus, F.	Ficus species.
Argina syringa, G.	Sunnhemp.
Argina cribraria, C.	Do.
Family—*Sphingidae*—	
Acherontia styx, W. and A. lachesis also sometimes.	Lab-lab, gingelly and brinjal.
Deilephila nerii, L.	Garden oleander.
Hippotion oldenlandiae, F.	Colocasia.
Hippotion celerio, L.	Grape-vine.
Herse convolvuli, L.	Sweet potato and green-gram.

ORDER—LEPIDOPTERA—*cont.*

	Chief host plants.
Family—*Sphingidae*—cont.	
Macroglossa vialis, B.	Morinda.
Rhopalopsyche bifasciata, B.	Do.
Family—*Eupterotidae*—	
Eupterote mollifera, W.	Moringa.
Nisaga simplex, W.	Paddy, grasses.
Family—*Bombycidae*—	
Ocinara varians, W.	Ficus *spp.*
Family—*Saturnidae*—	
Cricula trifenestrata, H.	Mango, cashew and pepper.
Actias selene, Hb.	Moringa and odina.
Family—*Notodontidae*—	
Stauropus alternus, W.	Red-gram and tamarind.
Family—*Limacodidae*—	
Parasa lepida, Cr.	Castor, palms and mango.
Altha nivea, W.	Castor.
Contheyla rotunda, H.	Coconut.
Natada nararia, M.	Pithecolobium dulce.
Belippa laleana, M.	Coffee.
Thosea cervina	Tea.
Family—*Geometridae*—	
Buzura (Biston) suppressaria, G. ...	Tea.
Family—*Lasiocampidae*—	
Metanastria hyrtaca, Cr.	Acacia and other trees.
Taragama siva, L.	Acacia.
Family—*Pyralidae*—	
Ancylolomia chrysographella, K. ...	Paddy.
Schoenobius incertellus, W.	Do.
Scirpophaga xanthogastrella, W. ...	Sugarcane.
Scirpophaga nivella, F.	Do.
Argyria sticticraspis, H.	Do.
Diatroea venosata, W....	Do.
Chilo zonellus, S.	Cholam and ragi.
Stenachroia elongella, H.	Cholam.
Saluria inficita, W.	Ragi.
Euzophera perticella, R.	Brinjal and chillies.
Euzophera plumbeifasciella, H. ...	Wood-apple.
Phycita infusella, M.	Cotton.
Phycita clientella, Z.	Brinjal.
Psara bipunctalis	Do.
Heterographis bengalella, Rag. ...	Custard apple.
Nymphula depunctalis, G.	Paddy.
Etiella zinckenella, T....	Sunnhemp.
Hymenia fascialis, C.	Amaranthus and grasses.
Marasmia trapezalis, G.	Cholam, maize, etc.

Order—LEPIDOPTERA—*cont.*

	Chief host plants.
Family—*Pyralidae*—cont.	
Cnaphalocrocis medinalis, G.	Paddy.
Sylepta derogata, Fb....	Cotton and other malvaceous plants.
Dichocrocis punctiferalis, G.	Castor, turmeric, arrowroot and ginger.
Lamprosema indicata, F.	Garden chrysanthemums and pulses.
Lamoria *sp.*	Boring into pungam pods.
Sylepta lunalis, G.	Grape-vine.
Crocidolomia binotalis, Z.	Cruciferous plants.
Leucinodes orbonalis, G.	Brinjal.
Margaronia stolalis, G.	Ficus *spp.*
Margaronia indica, S.	Cucurbitaceous plants.
Margaronia caesalis, W.	Jak.
Maruca testulalis, G.	Pulses.
Omphisa anastomosalis, D.	Sweet potato.
Hellula undalis, Fb.	Cabbage.
Glyphodes glauculalis, G.	Tabernimontana.
Psara pheopteralis, G....	Grasses.
Glyphodes unionalis, H.	Jasmine.
Antigastra catalaunalis, D.	Gingelly.
Terastia meticulosalis, C.	Erythrina.
Agathodes ostentosus, H.	Do.
Noorda blitealis, W.	Moringa.
Pyrausta machoeralis, W.	Teak.
Family—*Psychidae*—	
Clania crameri, W.	Acacia.
Family—*Zygaenidae*—	
Heterusia virescens, B.	Tea.
Family—*Zeuzeridae*—	
Azygophleps scalaris, F.	Agathi and daincha.
Zeuzera coffeae, N.	Coffee.
Family—*Arbelidae*—	
Arbela tetraonis, M.	Citrus, mango and other trees.
Family—*Pterophoridae*—	
Exelastes atomosa, W.	Red-gram.
Sphenarches caffer, Z....	Bottle gourd.
Family—*Tortricidae*—	
Homona coffearia, N.	Coffee.
Family—*Carposinidae*—	
Meridarches scyrodes, M.	Zizyphus.

Order—LEPIDOPTERA—*cont.*

	Chief host plants.
Family—*Eucosmidae*—	
Eucosma critica, M.	Red-gram.
Laspeyresia leucostoma, M.	Tea.
Laspeyresia tricentra, M.	Sunnhemp.
Laspeyresia torodelta, M.	Lab-lab.
Family—*Gelechiadae*—	
Stomopteryx nerteria, M.	Groundnut.
Platyedra gossypiella, S.	Cotton.
Pthorimoea operculella, Z.	Potato.
Pthorimoea blapsigona, M.	Brinjal.
Pthorimoea heliopa, L.	Tobacco.
Brachmia effera, M.	Sweet potato.
Dichomeres ianthes, M.	Indigo.
Dactylethra candida, S.	Wild indigo.
Family—*Oecophoridae*—	
Tonica zizyphi, St.	Citrus plants.
Family—*Xyloryctidae*—	
Nephantis serinopa, M.	Coconut and other palms.
Family—*Glyhyipterygidae*—	
Phycodes radiata, O.	Ficus *spp.*
Family—*Plutellidae*—	
Plutella maculipennis, C.	Cruciferous plants.
Family—*Gracillariadae*—	
Acrocercops syngramma, Meyr. ...	Mango.
Cyphostycha coerulea, M.	Lab-lab.
Gracillaria soyella, V. D.	Red-gram.
Family—*Lyonetiadae*—	
Phyllocnistis citrella, St.	Citrus plants.
Phyllocnistis toparcha, M.	Grape-vine.
Family—*Hepialidae*—	
Phassus malabaricus, M.	Tea.
Indrabala theivora, H.	Do.
Family—*Nymphalidae*—	
Euploea core, C.	Oleander.
Melanitis ismene, C.	Paddy.
Euthalia garuda, M.	Mango.
Danais chrysippus, L.	Calotropis.
Junonia orithyia, L.	Sweet potato.
Ergolis merione, Cr.	Castor.
Family—*Papilionidae*—	
Papilio demoleus, L.	Citrus and Murrayia.
Papilio polytes, L.	Do.

Order—LEPIDOPTERA—*cont.*

	Chief host plants.
Family—*Pieridae*—	
Catopsilia pyranthe, L.	Sesbania.
Terias hecabe, L.	Do.
Family—*Lycaenidae*—	
Chilades laius, C.	Citrus plants.
Polyommatus boeticus, L.	Pulses.
Euchrysops cnejus, Fb.	Do.
Virachola isocrates, F.	Pomegranate.
Tarucus theophrastus, F.	Zizyphus.
Family—*Hesperiadae*—	
Parata alexis, F.	Pongamia.
Gangara thyrsis, M.	Coconut.
Udaspes folus, Cr.	Turmeric.
Telicota augias, L.	Sugarcane.
Parnara mathias, F.	Paddy.
Suastus gremius, F.	Coconut.

Order—DIPTERA.

Family—*Cecidomyidae*—	
Pachydiplosis oryzae, M.	Paddy.
Aspondylia sesami, F.	Gingelly.
Aspondylia pongamiae, F.	Pungam.
Dasyneura gossypii, F.	Cotton.
Contarinia andropogonis, F.	Cholam.
Lasioptera falcata, F.	Bitter gourd.
Family—*Agromyzidae*—	
Agromyza obtusa, W.?	Red-gram.
Agromyza phaseoli, C.?	Cowpea.
Family—*Micropezidae*—	
Calobata, *sp.*	Turmeric and ginger.
Family—*Trypaenidae*—	
Dacus longistylus, W.	Calotropis.
Dacus brevistylus, B.	Melons.
Chaetodacus ferrugienus, F.	Guava, mango.
Chaetodacus incisus, W.	Do.
Bactrocera persicae, B.	Custard apple.
Bactrocera correctus, B.	Eugenia, mango.
Chaetodacus cucurbita, C.	Cucurbitaceae.
Chaetodacus caudatus, F.	Snake-gourd.
Carpomyia vesuviana, B.	Zizyphus.
Family—*Chloropidae*—	
Formosina flavipes, M.	Ginger.
Family—*Anthomyiidae*—	
Atherigona *sp.*	Paddy.
Atherigona indica, M.	Cholam.

Order—RHYNCHOTA.

	Chief host plants.
Family—*Pentatomidae*—	
Bagrada picta, F.	Cruciferous plants.
Coptosoma cribraria, Fb.	Pulses, pongamia, agathi, etc.
Coptosoma ostensum, D.	Palas, butea.
Coptosoma nazirae, At.	Cluster beans, mango, etc.
Stibaraopus tabulatus. F.	Tobacco.
Brachyplatys vahlii, F.	Agathi.
Vitellus orientalis, D.	Citrus plants.
Jurtina indica, D.	Pomegranate.
Tetroda histeroides, Fb.	Paddy.
Scotinophara lurida, B.	Do.
Cappaea taprobanensis, D.	Citrus plants on the hills.
Scutellara nobilis, F.	Phyllanthus.
Dolycoris indicus, S.	Cholam, red-gram, etc.
Menida histrio, Fb.	Paddy.
Eusarococoris guttiger, Th.	Cumbu.
Eusarococoris ventralis, W.	Gingelly.
Antestia cruciata, F.	Coffee, jasmine.
Agonoscelis nubila, F.	Cholam, ani-seed.
Nezara viridula, L.	Cumbu, castor, potato, etc.
Cyclopelta siccifolia, W.	Erythrina, pongamia.
Piezodorus rubrofasciatus, F. ...	Cholam.
Aspongopus janus, F.	Cucurbitaceae.
Aspongopus brunneus, N.	Do.
Family—*Coreidae*—	
Anoplocnemis phasiana, F.	Cowpea, brinjal, etc.
Leptocorisa acuta, Th.	Paddy.
Clavigralla horrens, D.	Pulses.
Clavigralla gibbosa, S.	Do.
Riptortus pedestris, F.	Do.
Riptortus linearis, F.	Do.
Dasynus antennatus, K.	Orange.
Family—*Lygaeidae*—	
Nysius inconspicuous, D.	Gingelly.
Oxycarenus loetus, K.	Cotton, gogu.
Aphanus sordidus, F.	Groundnut, cumbu.
Family—*Pyrrhocoridae*—	
Dysdercus cingulatus, Fb.	Cotton, gogu, etc.
Family—*Tingididae*—	
Urentius echinus, D.	Brinjal.
Stephanitis typicus, D.	Turmeric, plantain.
Monanthia globulifera, W.	Tulsi (*ocimum*) and safflower.
Jasmine Tingid	Jasmine.

Order—RHYNCHOTA—*cont.*

	Chief host plants.
Family—*Capsidae*—	
Calocoris angustatus, L.	Cholam, maize.
Megacoelum stramineum, W.	Cholam.
Helopeltis antonii, Sign.	Tea, cashew.
Disphinctus politus, W.	Betel-vine.
Disphinctus humeralis, W.	Tea, cinchona.
Gallobelicus crassicornis, D.	Tobacco.
Ragmus importunitas, D.	Sunnhemp.
Family—*Fulgoridae*—	
Eurybrachys tomentosa, F.	Calotropis.
Pyrilla perpusilla, W.	Sugarcane.
Ricania bicolorata, D.	Coffee.
Pundaluoya simplicia, Dt.	Cholam, maize.
Nysia atrovenosa, L.	Paddy.
Erythroneura subrufa, M.	Do.
Nilaparvata sordescens, M.	Do.
Purohita nigripes, D.	Bamboo.
Assamia moesta, W.	Sugarcane.
Family—*Cercopidae*—	
Cosmoscarta relata, D.	Jak.
Phymatostetha deschampsi, L. ...	Plantain.
Clovia lineaticollis, D.	Jak.
Ptyelus *sp.*	Do.
Family—*Jassidae*—	
Idiocerus niveosparsus, L.	Mango, sapota.
I. clypealis, L.	Do.
I. atkinsoni, L.	Do.
Tettigoniella spectra, D.	Paddy.
Nephotettix bipunctatus, F.	Do.
Empoasca flavescens, F.	Castor, tea.
Empoasca devastens, D.	Cotton.
Deltocephalus dorsalis, M.	Paddy.
Family—*Psyllidae*—	
Arytaina punctipennis, S.	Indigo.
Diaphorina citri, K.	Murrayia (curry-leaf plant) and citrus.
Trioza *sp.*	Eugenia.
Pauropsylla depressa, Cr.	Cinnamon, ficus.
Family—*Aleyrodidae*—	
Aleurolobus barodensis, W.	Sugarcane.
Aleurocanthus spiniferus, Q.	Citrus.
Dialeurodes vulgaris, K.	Jasmine.
Dialeurodes eugeniae, M.	Eugenia.
D. citri, A.	Citrus.
Neomaskellia bergi, S.	Sugarcane.

Order—RHYNCHOTA—*cont.*

	Chief host plants.
Family—*Aleyrodidae*—cont.	
Trialeurodes ricini, M.	Castor.
Siphonimus finitimus, S.	Pomegranate.
Family—*Aphididae*—	
Aphis maidis, F.	Cholam.
Macrosiphum solidaginis, F.	Safflower.
M. rosaeformis, D.	Rose.
Toxoptera graminum, R.	Wheat.
Tetraneura hirsuta, B.	Ragi.
Myzus persicae, S.	Tobacco and cruciferae.
Tetraneura ulmi, K. coimbatorensis, G.	Sugarcane.
Aphis gossypii, G.	Cotton.
Greenidea artocarpe, W.	Jak.
Aphis medicagenis, K.	Lab-lab.
Dilachnus krishni, G.	Pear.
Eriosoma lanigera, H.	Apples, pears, etc.
Aphis tavaresi, D.	Citrus plants.
Aphis odinae, V. D.	Mango.
Oregma bambusae, B.	Bamboo.
Aphis malvae, K.	Cucurbits.
Aphis nerii, B.	Calotropis.
Family—*Coccidae*—	
Icerya purchasi, M.	Citrus and wattles on Nilgiris.
Icerya aegyptiaca, D.	Garden crotons, jak ficus.
Aspidoproctus cinerea, Gr.	Pomegranate.
Aspidoproctus xyliae, Gr.	Rain tree.
Monophlebus phyllanthi, Gr.	Garden crotons.
Ripersia oryzae, Gr.	Paddy.
Ripersia sacchari, Gr.	Sugarcane.
Phenacoccus hirsutus, Gr.	Teak shoots, ficus.
Phenacoccus ornatus, Gr.	Jasmine.
Phenacoccus iceryoides, Gr.	Citrus, cotton, rain tree, etc.
Phenacoccus mangiferae, Gr. ...	Mango.
Phenacoccus insolitus, Gr.	Brinjal.
Pseudococcus bromeliae, B.	Pine-apple.
Pseudococcus lilacinus, C.	Pomegranate, tamarind.
Pseudococcus corymbatus, Gr.	Jak, citrus, Gr.
Pseudococcus virgatus, C.	Crotons, tomato, cotton, etc.
Pseudococcus longispinus, T.	Coconut.
Pseudococcus citri, R.	Cacao, coffee.
Pseudococcus detorquens, G.	Bamboo.
Asterolecanium longum, G.	Do.
Cerococcus hibisci, G.	Cotton, garden hibiscus, tephrosia.
Anomalococcus indicus, G.	Acacia.

Order—RHYNCHOTA—*cont.*

	Chief host plants.
Family—*Coccidae*—cont.	
Aclerda japonica, N.	Sugarcane.
Lecanium discrepans, G.	Mango, banana.
Lecanium viride, Gr.	Coffee, citrus, bael, etc.
Lacanium adersi, N.	Mango.
Lecanium ramakrishnae, Gr.	Ficus.
Lecanium depressum, C.	Crotons.
Lecanium longulum, D.	Red-gram, grape.
Lecanium hesperidum, L.	Citrus, coconut.
Saisesetia oelae, B.	Tamarind, erythrina, fig.
Saissetia hemisphaericum, T. ...	Coffee, guava, ferns, tea, etc.
Saissetia nigra, N.	Cotton, thespesia, hibiscus *sp.*, croton, etc.
Ceroplastodes cajani, M.	Red-gram, tulsi, zizyphus.
Ceroplastes floridensis, C.	Cashew.
Ceroplastes actiniformis, Gr.	Coconut, calophyllum.
Vinsonia stellifera, W.	Do.
Pulvinaria maxima, Gr.	Nim, cotton.
Pulvinaria psidii, M.	Guava, citrus, mango, etc.
Parlatoria zizyphus, L.	Citrus.
Parlatoria camelliae, C.	Nim.
Lepidosaphes meliae, Gr.	Do.
Lepidosaphes becki, Newst	Orange on the Nilgiris.
Lepidosaphes piperis, Gr.	Pepper.
Aspidiotus hartii, C.	Turmeric, yam.
Aspidiotus triglandulosus, Gr. ...	Jak.
Aspidiotus ficus, A.	Citrus, coconut.
Aspidiotus aurantii, M.	Rose, jasmine.
Aspidiotus tamarindii, Gr.	Tamarind.
Aspidiotus cydoniae, C.	Grape.
Aspidiotus camelliae, S.	Tea.
Aspidiotus lataniae, S.	Grape.
Aspidiotus orientalis, N.	Tamarind.
Aspidiotus cyanophylli, S.	Plantain.
Aspidiotus destructor, S.	Coconut, plantain.
Pinnaspis aspidistroe, S.	Pepper, areca.
Chionaspis vitis, Gr.	Mango.
Chionaspis dilatata, Gr.	Areca, ferns.
Chionaspis elongata, G.	Bamboo.

Order—THYSANOPTERA.

Family—*Thripidae*—	
Selenothrips rubrocinctus, G. ...	Cashew.
Dendrothrips bispinosus, B.	Tea.

ORDER THYSANOPTERA—*cont.*

	Chief host plants.
Family—*Thripidae—cont.*	
Scirtothrips dorsalis, H.	Chillies.
Rhipiphorothrips cruentatus, H. ...	Grape-vine, rose, etc.
Heliothrips haemorrhoidalis, B. ...	Garden crotons.
Ayyaria chaetophora, K.	Do.
Heliothrips indicus, B.	Groundnut, onions, etc.
Taeniothrips distalis, Ky.	Lab-lab and other pulses.
Isoneurothrips orientalis, B	Jasmine, morinda.
Thrips oryzae, W.	Paddy.
Thrips nilgiriensis, R.	Citrus.
Thrips tabaci, L.	Onions, garlic, cotton.
Bregmatothrips ramakrishnae, B. ...	Sugarcane.
Panchaetothrips indicus, B. ...	Turmeric, arrowroot.
Family—*Phloeothripidae—*	
Arrhenothrips ramakrishnae, H. ...	Mimusops.
Gigantothrips elegans, Z.	Ficus *spp.*

III.—CROP PEST CALENDARS FOR THE MADRAS PRESIDENCY.

The matter in this section which was prepared by the author in 1921 appeared as a departmental bulletin (No. 80). It is now believed that the same might be found very useful for reference purposes if issued as a supplement to this revised bulletin on crop pests.

In almost every agricultural tract one often comes across intelligent farmers who are able to tell us with a certain amount of confidence and precision, something about the important insect pests that appear on the various crops grown by ryots in their tract season after season. In certain localities we often meet with landholders who not only possess this knowledge but are also able to pronounce rough predictions regarding the approximate time of appearance of some of the important pests every year. This is, of course, due to previous experience, and in spite of the fact that there may be mistakes in such forecasts they are not found altogether valueless. In the same way that the farmer of one particular area is enabled to predict such a thing in his tract, the Agricultural Department, with its experience of several years in the past, is now in a position to roughly indicate the time of appearance of important crop pests during any normal year in all the different agricultural tracts of the Madras Presidency with perhaps a little more definiteness based on scientific knowledge. This information collected together and properly arranged may be called the "Entomolgist's Crop Pests Calendar for the Madras Presidency."

It must be emphasized, however, that the information attempted to be given in these calendars is based purely on a limited experience

of a few years and does not in any way pretend to be comprehensive or very accurate. In spite of the inevitable defects which such calendars are bound to possess, it is believed that the same might still serve some useful purpose to those interested in scientific agriculture and natural science. To the farmer who is anxious to reduce the annual toll levied by insects on his crops, a correct knowledge of the probable time of appearance of important insect-pests during the year will be a very valuable help. For, in most cases of insect attacks, especially on field crops grown over extensive areas, preventive and precautionary methods go a great way in saving the situation. Therefore, it is apparent that such a knowledge will serve as a sort of warning to the farmer to be on the look-out for the pests and be prepared beforehand to take prompt measures the moment the pest makes its appearance or even just before it is expected to appear. To the Agricultural Entomologist this knowledge is much more; it gives him, in addition, a clue to the seasonal habits of the different crop insects, their life cycles during the year, and a number of other interesting items in the biology of the various organisms. It helps the official Entomologist of any province not only to proceed to the different localities at the proper time to carry out investigations, but also to organize his campaigns against various pests sufficiently early and not be compelled to rush at the eleventh hour all unprepared when the pest has already appeared and done some appreciable mischief. He may find it difficult to pre-arrange the work of his staff which might often be insufficient and not available in time, if some sort of a time-table is not chalked out for them corresponding to the periods of appearance of the different crop pests. A calendar of this sort is not without its use to the outsider. The district Revenue and Agricultural officer who has to be in touch with the agricultural population of his tract may also find in the calendar some useful information; and he, being in a better position than many others to come into contact with cultivators, might easily impart the information in the calendar which many an illiterate and poor ryot might find helpful. To an outside Entomologist who wishes to study particular pests of the province, a calendar might indicate to him the approximate time of the year when he could arrange to visit the locality with advantage. And as to its utility to an insect expert coming fresh into the country with absolutely no experience of the local conditions, no one, I think, will have any doubts.

To facilitate the proper arrangement of the information to be given in such an insect calendar all the important injurious insects of any province may be divided into three convenient groups. The first includes the major pests which occur regularly during certain seasons year after year and cause more or less damage to crops; the second includes certain insects which are generally of minor importance and are occasionally found in small numbers, but which during certain years, become serious sporadic local pests; and under the third are included the remaining injurious insects, which do not exhibit any special seasons for appearance, but which are

found all through the year on their food plants. Of the three divisions the insects of the last group do not apparently demand any calendar at all as their activities are not restricted to any particular period of the year. It is therefore the insects of the first two groups that have to find a place in the calendar.

It must be stated that in some respects a pest calendar is quite different from an ordinary weather almanac or astronomical chart. The information contained in the latter is often applicable to a whole set of countries or even a continent or two. But in the case of the former the time of appearance and exit of the same and different crop pests differ remarkably in the various agricultural tracts of a single province. This is because the agricultural conditions are varied in the different regions of the province and the outbreaks of crop pests and diseases depend a good deal on the weather and agricultural conditions of each tract. In this Presidency we have several distinct agricultural areas each possessing climatic and physical features of its own, and naturally the crop seasons vary a good deal in the different tracts, the same crop having its own appropriate time in the year in the different regions. We have the West Coast area with its unfailing heavy rains, chiefly during the south-west monsoon season; there are the delta tracts which are irrigated by the big rivers Gōdāvari, Kistna and the Cauveri ; next the East Coast which shares a part of the south-west monsoon in the Circars and gets the full benefit of the north-east monsoon rains along the Coromandel tracts ; and then we have the central plateau and the southern undulating plains with a scanty and capricious rainfall. (See Map.) This being the case, even the same insect affecting a particular crop often appears in the different areas in different seasons.

All these aspects have been kept in view, as far as possible, in bringing together the necessary information. The calendar itself is made up of a few diagrams designed chiefly to indicate at a glance all the salient facts regarding the periodicity and geographical distribution of the important insect pests of different crops in the Presidency.

For insects of the first group two diagrams are designed : (Nos. I and II).

Diagram No. I.—This is a circular one and devoted solely to indicate the calendar of the important pests of paddy alone in the Madras Presidency. Ten insects affecting this crop are selected as being the most important and each is allotted a sort of orbit, the design thus showing ten concentric circles. These circles are divided into twelve portions to indicate the months of the year. On this ground plan the seasonal occurrence of each pest is marked in shading with the name or names of the district where the pest appears at that time. In addition, the figure of each pest is added at the sides of the circular diagram and is indicated in the diagram by reference numbers. The addition of the figures will help non-scientific men to make out clearly which are the pests that are referred to inside the diagram. The paddy pests included are (1) the swarming caterpillar, (2) stem-borer, (3) hispa, (4) leptispa, (5)

bug, (6) caseworm, (7) grasshopper, (8) gallfly, (9) mealybug, and (10) thrips.

Diagram No. II.— This is a tabular diagram and shows in the same manner the geographical distribution and seasonal occurrence of the chief pests of some important crops other than paddy. Here the insects selected are (1) the red hairy caterpillar, (2) the castor semi-looper, (3) the mango hopper, (4) the tobacco aphis, (5) the tobacco caterpillar, (6) the cotton aphis, (7) the cotton stem-weevil, (8) the cotton bollworms, (9) the cholam earhead bug, (10) the gingelly leafroller, (11) the castor-slug, (12) the gram caterpillar, (13) the caneborers, (14) the sunnhemp hairy caterpillar, and (15) the groundnut leaf miner. These are fifteen of the important pests of different crops other than paddy.

Diagram No. III.—For insects of the second group the arrangement is shown in the next diagram. This is also a tabular one and is designed to represent particulars of insects which are not regular pests during normal years, but which assume pest conditions, in certain years when conditions appear favourable to them. So far, the following ten insects might be taken as important examples of the group :— (1) The climbing cut worm of the Coromandel tracts which does considerable damage to ripening paddy earheads during the cold weather in certain years; (2) the black hairy caterpillar on ragi, cumbu, etc.; (3) the Deccan grasshopper of the Ceded Districts; (4) the surface weevil of cotton; (5) the green-gram sphinx; (6) the tussock caterpillar of castor; (7) cotton grasshopper; (8) surface grasshopper of paddy seedlings and ragi; (9) blister beetles on cereal earheads; (10) the green plant bug of cumbu and castor.

All the three diagrams contain information regarding seasonal and geographical distribution of the insects noted in each.

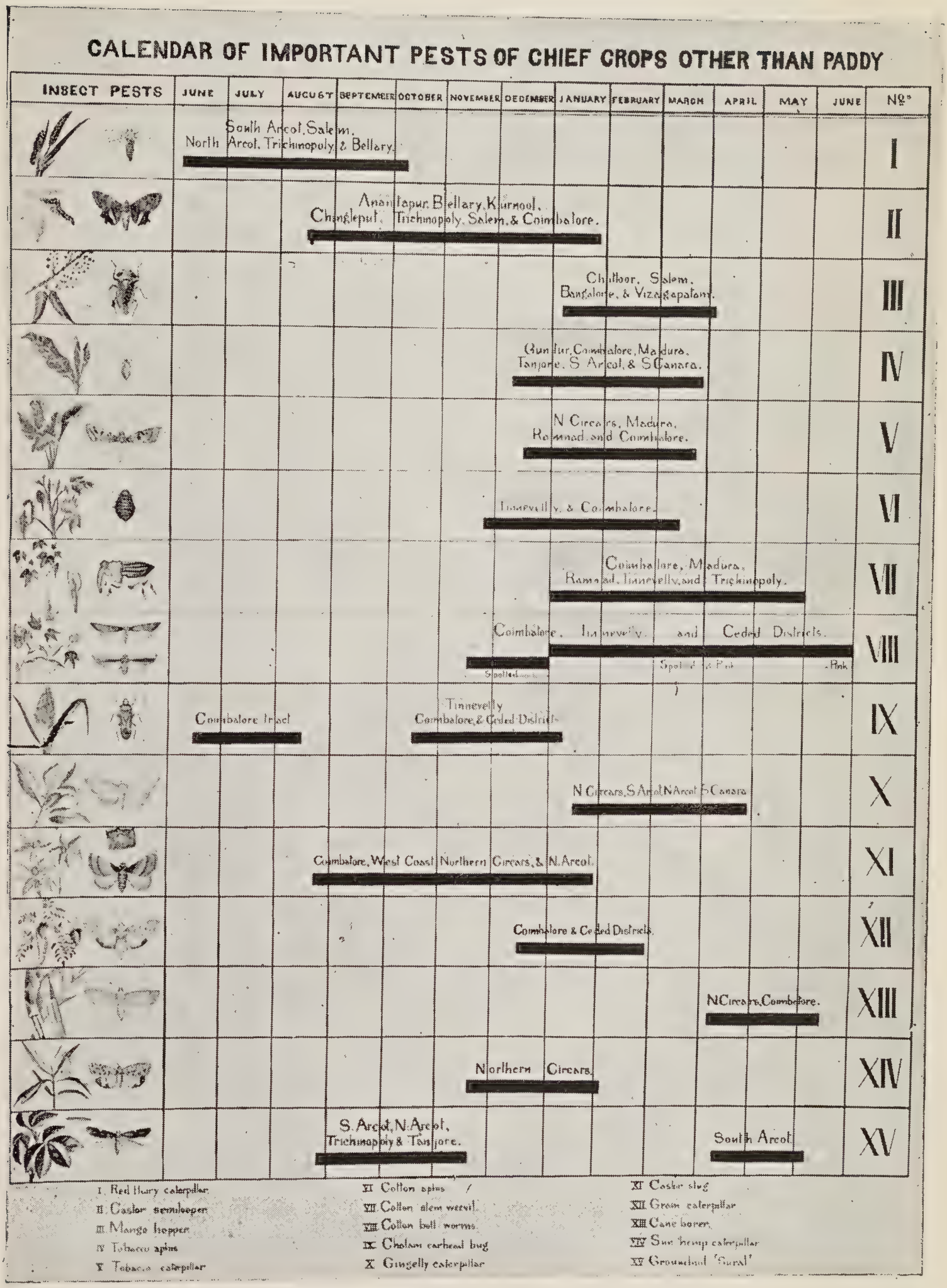
A map of the Madras Presidency is also added for reference purpose.

With regard to the information contained in this calendar two points have to be remembered; (1) that the insects referred to in the diagrams are not exclusively restricted in distribution to those districts which are noted therein; many or all of them have a wider distribution and are found on their respective food plants in many localities though not in pest form; (2) that the insects referred to in the diagrams are not the only injurious ones of the two groups referred to above in this province, but there are also others, but that, the ones in the diagrams are taken as the more important ones as far as our present knowledge has advanced.

As stated at the outset these calendars are based on the knowledge and experience gained till now. In course of time, as our experience and knowledge of the different insects of the province increase, it might be found necessary and possible to correct the information contained in this pamphlet in the light of fresh knowledge. Till then it is believed they may be of some use to farmers and others interested in the progress of agriculture in this province.

Calendar No. 1.

CALENDAR No. II.



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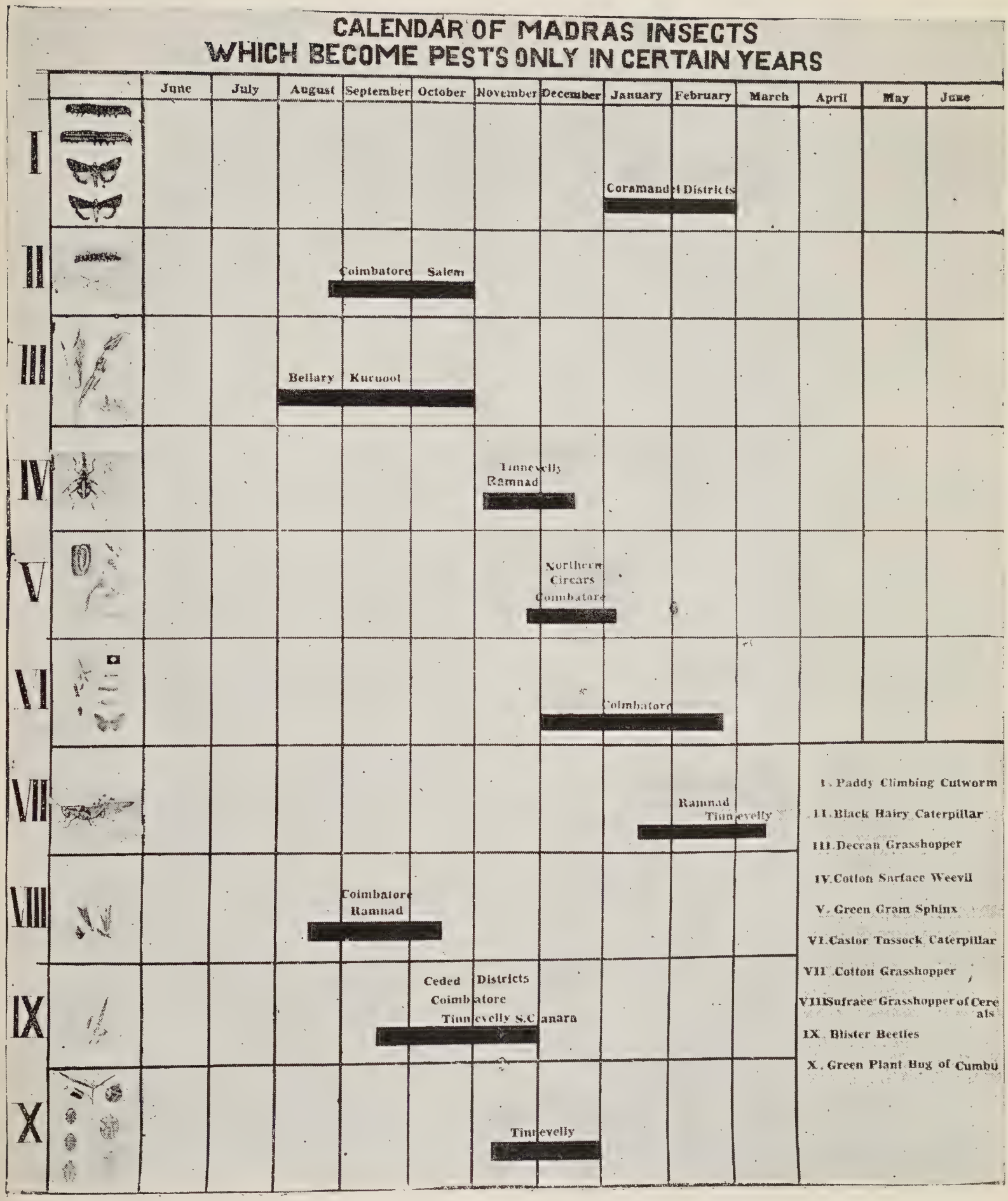

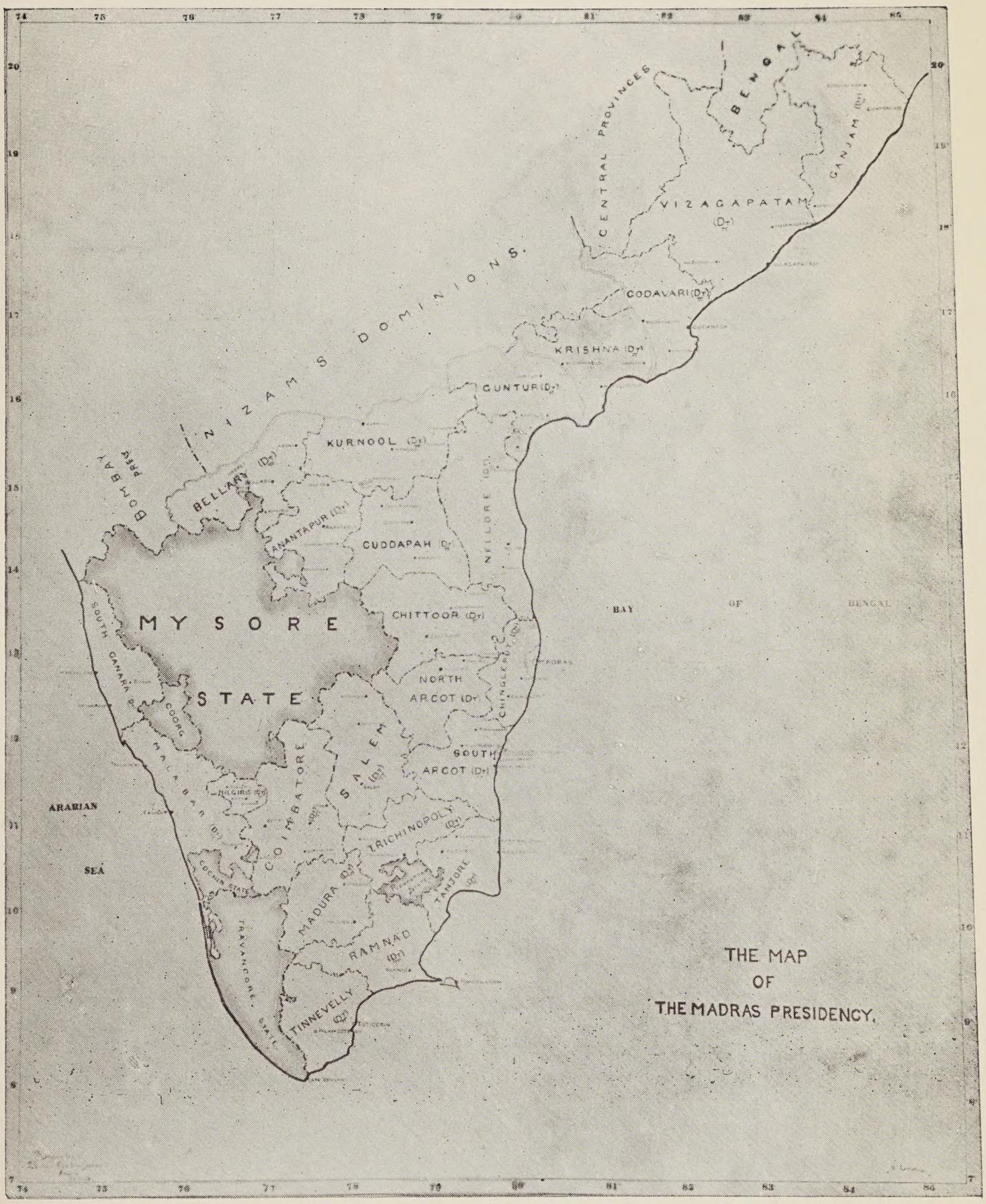

THE MAP
OF
THE MADRAS PRESIDENCY.

B

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